



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Promoting a 'duty of care' towards animals among children and young people

Citation for published version:

Muldoon, J, Williams, J, Lawrence, A, Lakestani, N & Currie, C 2009, *Promoting a 'duty of care' towards animals among children and young people: A literature review and findings from initial research to inform the development of interventions*. Child and Adolescent Health Research Unit, University of Edinburgh, Defra.

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



PROMOTING A 'DUTY OF CARE' TOWARDS ANIMALS AMONG CHILDREN AND YOUNG PEOPLE

A literature review and findings from initial research to inform the development of interventions

September 2009



Janine Muldoon
Joanne Williams
Alistair Lawrence
Nelly Lakestani
Candace Currie

Promoting a 'duty of care' towards animals among children and young people:
A literature review and findings from initial research to inform the development of
interventions

2009

Janine Muldoon
Jo Williams
Alistair Lawrence
Nelly Lakestani
Candace Currie

Contents

Part I:	INTRODUCTION	3
	Background to the project	3
	Animal welfare and DOC	3
	Our approach to understanding how to intervene	4
	The importance of context	5
	Structure of the report	6
Part II:	LITERATURE REVIEW: CHILD-ANIMAL INTERACTIONS	7
	What does the evidence suggest about children's interactions with animals?	7
	A: Children's knowledge and concepts of biology	8
	Introduction	8
	What do we mean by naïve biological theories and concepts?	8
	When and how do naïve biological concepts develop during childhood?	9
	Existing measures of naïve biology concepts	9
	Factors affecting knowledge uptake/conceptual development	10
	Summary & implications for interventions to promote a DOC	13
	B: Children's attitudes and behaviour towards animals	14
	Introduction	14
	What do we mean by attitudes?	14
	The origins of attitudes	14
	The literature on adults' attitudes towards animals	16
	Children's attitudes towards different types of animal	17
	Children's attitudes towards animal use	18
	Children's caring attitudes and behaviour towards animals	19
	Existing measures of attitudes/behaviour	19
	Factors that influence attitudes/behaviour	20
	Summary & implications for interventions to promote a DOC	26
	C: Children's emotional reactions (empathy and attachment)	27
	Introduction	27
	What do we mean by empathy and attachment?	27
	Attachment and pets as family members	27
	Fear of animals	28
	Existing measures of empathy and attachment	29
	Factors affecting empathy and attachment towards animals	29
	Summary & implications for interventions to promote a DOC	33
Part III:	INITIAL RESEARCH WITH CHILDREN	34
	Introduction	34
	A: Focus groups with children	35
	Aims and objectives of the focus groups	35
	Methodology and sample	35
	Preliminary findings from the focus groups	36
	Summary & implications for interventions to promote a DOC	40

B: The pupil survey	41
Background, aims and objectives	41
Survey development and administration	41
Measures	41
The sample	42
Preliminary findings from the pupil survey	42
Further development of the research with children	46
Summary & implications for interventions to promote a DOC	48
Part IV: INTERVENTIONS	49
What kinds of interventions are currently being used and how is their effectiveness evaluated?	49
Introduction	49
A: Evidence on interventions from the published literature	50
Enhancing children's attitudes, knowledge, empathy and behaviour towards animals	50
The evidence base on 'humane' education and improving child-animal interactions	50
Research on biology education and cognitive development	56
Summary & implications for interventions to promote a DOC	58
B: Initial research with stakeholders	59
Background	59
Aims and objectives of the stakeholder research	59
Survey development and administration	59
The sample	60
Findings from the stakeholder research	60
Summary & implications for interventions to promote a DOC	72
Part V: INTEGRATING FINDINGS AND ASSESSING IMPLICATIONS	73
What do our findings mean for the development of interventions to promote a DOC?	73
Introduction	73
Intervention development	75
Recommendations for future research	76
Key implications for intervention development	76
Acknowledgements	79
Appendices	
Appendix 1: The benefits of interactions with animals	81
Appendix 2: Key points from the field of animal cruelty in childhood	82
Appendix 3: The stakeholder survey (administered on-line)	83
Appendix 4: The pupil survey (administered in schools)	88
Appendix 5: The protocol for the administration of the pupil survey and focus groups	96
References	99

PART I: INTRODUCTION



Background to the project

1. This report presents findings from the first year of a three-year project that aims to ascertain the most effective ways to promote a duty of care (DOC) towards animals among children and young people. The project began in October 2008 and was instigated by a call from the Department for Environment, Food and Rural Affairs (Defra) for research in this area in line with recent changes in animal welfare law.
2. Previous research evidence has highlighted the importance of focusing attention on young people (<18 years of age). Their role as adults of the future (particularly in a parental role) is clearly an important reason for targeting young people. As adults, they will have direct responsibility for pets, and, as purchasers of foods derived from animals, they will have the capacity to exert positive consumer pressure on humane food production methods.
3. It makes sense to educate and instil positive values early on and we believe this is important not just for animal welfare but human wellbeing too. Qualitative research suggests that animals play a significant role in children and young people's lives; a role that adults may even underestimate. Children are often recipients of pets as 'gifts' and play a role in their day-to-day care and they often interact with animals in recreational pursuits (horse riding, visits to zoos, etc.). Yet, the ways in which children's knowledge and perceptions of their relationships with animals translate into different ways of caring for them is not well understood. This project aims to develop this understanding in order to ascertain the types of intervention that will have the most impact.
4. In the next part of this introduction, we provide more background to the project, describing what is meant by animal welfare and DOC as embedded within the Animal Welfare Act (2006). We then describe our approach to the project, first highlighting the key areas we have identified as important and the ways in which they interact. Secondly, a brief discussion of the importance of context is provided. Finally, the structure of this report is described on Page 8.

Animal welfare and DOC

5. Animal welfare is generally defined as an ethical concern for the animals that are under our care and management and includes both the animals' physical and mental well-being (e.g., FAWC, 2008). The origins of modern-day animal welfare concerns can be traced to the gradual acceptance that animals are sentient, having the capacity to experience and to suffer (e.g., Lawrence, 2008b). As acceptance of animal sentience has continued to grow (in part through further scientific evidence of the similarities between animals and humans), so has the 'moral pressure' to protect animals, leading to a continuous development of EU and UK animal protection legislation.
6. The Animal Welfare Act (2006) is a particularly important piece of legislation. It makes owners and keepers responsible for ensuring that the welfare needs of their animals are met. It is no longer just cruelty towards animals that is against the law, but also the failure to meet welfare needs. The concept of responsibility for animal welfare is extended to all vertebrates managed, used and cared for by humans (Defra, 2006). Therefore, a large number of people in the UK are now affected as domestic or companion animal owners. In the UK, 23 million pets are currently owned (excluding fish) by 43% (11.2 million) of households (Pet Food Manufacturers

Association, 2009). The concept of a 'duty of care' (DOC) had not been applied to these animals in previous legislation.

7. The responsibilities listed in the Animal Welfare Act are very similar to the Five Freedoms developed and promoted by the UK's Farm Animal Welfare Council (FAWC, 2009) (see Table I.1).

Table I.1

Owners/keepers must ensure they meet their animal/s welfare needs:	
1. For a suitable environment (place to live)	
2. For a suitable diet	
3. To exhibit normal behaviour patterns	
4. To be housed with, or apart from, other animals (if applicable)	
5. To be protected from pain, injury, suffering and disease	Animal Welfare Act (2006)
The Five Freedoms (FAWC, 2009)	
1. Freedom from hunger and thirst – by ready access to fresh water and a diet to maintain full health and vigour	
2. Freedom from discomfort – by providing an appropriate environment including shelter and a comfortable resting area	
3. Freedom from pain, injury or disease – by prevention or rapid diagnosis and treatment	
4. Freedom to express normal behaviour – by providing sufficient space, proper facilities and company of the animal's own kind	
5. Freedom from fear and distress – by ensuring conditions and treatment which avoid mental suffering	

8. Much of the research effort in animal welfare has been directed towards gaining a biologically-based understanding of animals' needs and welfare in the context of their housing, development and breeding (e.g., Lawrence, 2008a). However, given that improvements in animal welfare are dependent on human behaviour; social scientific approaches are increasingly being employed to identify the most effective means of enhancing human owners' care for their animals.

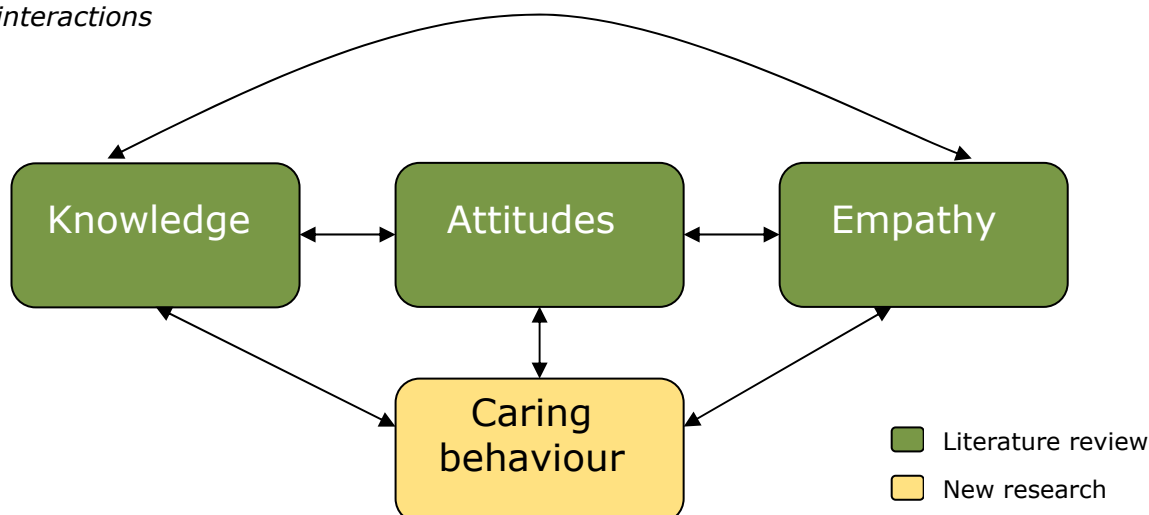
Our approach to understanding how to intervene

9. At the heart of our work is a belief in the reciprocal benefits of human-animal interactions. This field of research has typically been anthropocentric in that animals have been viewed in terms of their benefits to humans and not the other way round (Bowd, 1989) (see Appendix 1 for a summary of the benefits noted in the literature). Studies of animal cruelty (see Appendix 2) are similar; viewed as important because it often precedes abuse of humans. Animal welfare perspectives, on the other hand, have tended to focus only on the animal. There is evidence that animals also benefit in similar ways to people, from having positive interactions with them (e.g., lowered stress responses and better growth). Although it is beyond the scope of this report to include a review of the use of animals in therapeutic settings, this significant area of research will be of interest throughout the study. Indeed, recognition of the reciprocal influence (the benefits to humans and animals) may be a powerful tool within interventions.
10. We are also interested in what constitutes *ideal* and not just adequate care for animals and believe that knowledge about animals' basic needs, though fundamental, is not sufficient. Appropriate care for animals must stem from an accurate understanding of animal needs, when they arise and how to respond if signs of distress are apparent. It is also important, in the context of the Act, to provide opportunities for animals to experience positive welfare. In this sense, it is important

to understand affective/empathic responses and attitudes (that may or may not be evidence or knowledge-based) as potentially strong influences on stimulating positive behaviour towards animals in children.

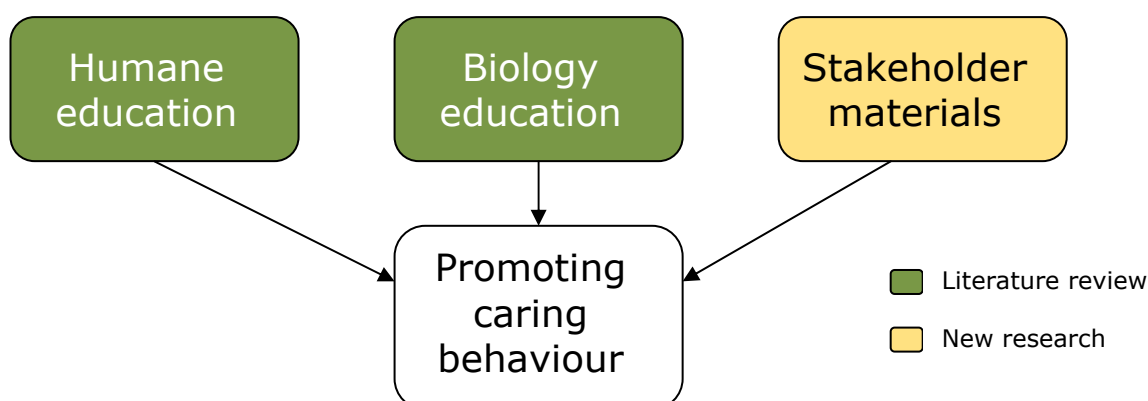
11. We believe it is important to understand these three broad and interrelated areas of children's relationships with animals: their **knowledge, attitudes and empathy** with respect to animals (see Figure I.1). Therefore, our first piece of work entailed reviewing existing evidence in these three areas, the findings of which are presented in Part II. Given the paucity of research on children's caring activities and on UK children's perspectives on animal welfare, we have also developed some original research to help inform future research directions (see Part III).

Figure I.1: Understanding how to intervene – the evidence base on child-animal interactions



12. Alongside this research on children's interactions with animals, we recognise the importance of enhancing our knowledge of interventions and their evaluation. There is a limited but growing evidence base on interventions promoting positive attitudes and behaviour towards animals among children. However, a wealth of materials has also been developed by organisations with a human/animal welfare remit. These are covered in Part IV (see Figure I.2).

Figure I.2: Understanding how to intervene – research evidence on interventions and materials used in practice



The importance of context

13. It is important to recognise that meeting animals' needs is not always straightforward partly because they are not fully understood. Determining how, where and when to promote positive, caring behaviour towards animals is also a significant challenge, as adults often behave in confused and conflicting ways towards animals (Isaacs, 1930). Moreover, parents may not always communicate the truth about pets (e.g., issues surrounding death) in a bid to protect children and avoid emotional distress.

14. Children's prior experience of animals, parental and peer attitudes and behaviours, and the ways in which animals are used, understood and represented within the society in which children are growing up, each contribute to the knowledge, attitudes and empathy they develop. Effective interventions therefore rely on a sound understanding of the psychological processes involved in children's relationships with animals but within the context of their socialisation (Bowd, 1989).
15. This report focuses mainly on pets as: (a) this is the focus of most of the research on child-animal interactions; (b) most children and young people have direct experience with pets but not necessarily other animals, and (c) the DOC placed on pet carers by the Animal Welfare Act makes it a critical policy issue. However, our review and focus groups cover children's attitudes towards farm and wild animals. We have not imposed a limit on age range for our review, although pet ownership is said to peak in middle childhood (9 to 12-years-old), with lower frequency of ownership among children younger than 9 and teenagers (Paul & Serpell, 1993). Therefore, a wider range of evidence on attitudes/attachment to pets was found for this age group.

Structure of the report

16. *Part II: Literature review (child-animal interactions)*

Part II reviews and summarises the literature on child-animal relationships within the three broad areas outlined earlier:

- (a) Knowledge and biology concepts
- (b) Attitudes and behaviour towards animals
- (c) Emotional reactions (empathy and attachment)

Each section provides a definition of and background to the area of interest and is structured in the same way; examining what is currently known about influential factors: children's direct experience of animals; age (developmental trends); gender, ethnic and cultural influences (media/society), and geography (urban/rural residence). Each section ends with a summary, highlighting the implications for interventions to promote a DOC.

17. *Part III: Initial research with children*

Part III describes our initial research with children and is organised in two parts to reflect two different aspects of the study: (a) Focus groups with children, and (b) The pupil survey. Both methods were employed to supplement the review, extend previous research and obtain a UK perspective on children's interactions with, and perceptions of, animals. The focus groups were designed to shed light on the un-researched area of children's care of their pet animals and issues of responsibility. The survey was undertaken to assess the links between pet ownership, attitudes towards animals, attachment to pets and empathy, and to trial existing measures that might be usefully employed to assess the impact of different intervention types. Each section provides a description of the research background, the aims, objectives, methodology and sample. Subsequently, preliminary findings and a brief summary are presented.

18. *Part IV: Interventions*

Part IV concentrates on interventions and is organised in two parts: (a) Evidence from the published literature, and (b) Initial research with stakeholders. Section A examines the evidence base relating to interventions from both the literature on humane education and biology education/cognitive development. Section B describes our approach to understanding the stakeholder role and perspective and presents findings from our on-line survey.

19. *Part V: Integrating findings and assessing implications*

Part V draws together the findings from the different sections of the report and makes recommendations for the development of interventions and future research.

PART II: LITERATURE REVIEW - CHILD-ANIMAL INTERACTIONS

What does the evidence suggest about children's interactions with animals?

20. Part II is broken down into three sections:

A: CHILDREN'S KNOWLEDGE AND CONCEPTS OF BIOLOGY

B: CHILDREN'S ATTITUDES AND BEHAVIOUR TOWARDS ANIMALS

C: CHILDREN'S EMOTIONAL REACTIONS (EMPATHY AND ATTACHMENT)

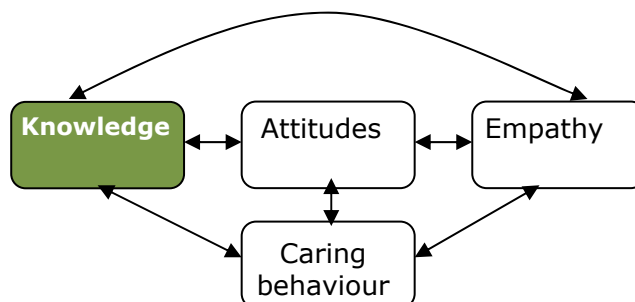
In many respects, these are false divisions, as they are closely related and influence each other. However, we retain this distinction as far as possible for ease of understanding. In Part V, we begin to draw together research findings from each of these areas; having discussed within each of the three sections here, the implications of the evidence base for the longer-term goal of developing interventions.

21. Serpell (1999) notes a strong resistance to the study of child-animal relations within psychology, which is surprising, given the extraordinary prominence of animals in our culture. While this is changing and many studies of child-animal relationships can be found (particularly concerning attitudes), few shed direct light on children's caring behaviour. In addition, there appears to be no overarching theoretical framework guiding this work. By contrast, there are established psychological theories relating to the development of knowledge, attitudes and empathy. We therefore examine the relevant literature in the context of these theoretical constructs.

II A: Children's knowledge and concepts of biology

Introduction

22. Cognitive development is one of the largest and most contested areas of research within developmental psychology. To narrow the scope of this review, the research specifically on children's cognitive development in relation to animals and biological processes will be targeted. Children's understanding of basic life processes such as illness and health, growth and nutrition, and life and death underpin their own health-related behaviour and their caring behaviour towards animals.
23. For the last 20 years there has been a growing conviction, among researchers, that children's understanding of biology is qualitatively different from other areas of knowledge. This view has been shaped by evidence that cognition is domain-specific, meaning that the content of cognition influences cognitive development and learning (e.g., Karmiloff-Smith, 1992; Wellman & Gelman, 1992; Gopnik & Meltzoff, 1997). For example, children's understanding of illness and number develop independently of each other and children can develop advanced knowledge of one area without similar knowledge gains in the other.
24. There is now a substantial and growing body of evidence that children develop naïve biological knowledge prior to formal schooling, that this knowledge develops as a consequence of a range of direct and indirect experiences, and that it affects their attitudes (see below), behaviour and learning (Siegal & Peterson, 2002; Medin & Atran, 2004; Inagaki & Hatano, 2002). Furthermore, their naïve biology concepts are sometimes inaccurate or partial and are commonly referred to as misconceptions (e.g., Aria, Uno, Kudo & Shirai, 2001).



What do we mean by naïve biological theories and concepts?

25. Within domain-specific cognition, a distinction has been drawn between framework theories and specific theories (Wellman & Gelman, 1992; Wellman & Inagaki, 1997). In relation to biology, children develop a framework theory that distinguishes biological living things from non-living things. This distinction is an early developmental achievement and evidence suggests that young children and possibly infants can distinguish between living and non-living things and have concepts of animals (Ricard & Allard, 1993). Within this broad framework, young children develop a wide range of specific biology theories including concepts of life and death, growth, food and eating, inheritance and reproduction, and illness and health (see below).
26. Children's naïve theories in biology can be distinguished from formal or scientific theories because they are the product of the interactions between a child's cognitive efforts and their biological environment rather than simply the result of formal tuition in biology.
27. The term 'theory' within this research is defined as having four characteristics. Theories are: abstract, coherent, they specify causal mechanisms and they have ontological commitments; that is, they are specific to a particular type of phenomena (i.e., plants and animals in the case of biology) (Gopnik & Meltzoff, 1997). A concept or conceptualisation is a set of understandings or beliefs that may or may not be integrated into a coherent naïve theory. There is debate about the status of

children's biology knowledge in terms of whether it is theory-like or composed of a range of piecemeal knowledge that is not coherent in structure (Williams & Smith, in press). Thus, evidence suggests children have naïve biological concepts but these concepts may not be highly coherent or consistent. This has implications for education because if children's knowledge is not theory-like, they may not respond to evidence presented in educational interventions by altering their naïve concepts in the direction of more accurate knowledge. Instead, they may just add additional knowledge onto their existing naïve concepts.

When and how do naïve biological concepts develop during childhood?

28. There is substantial discussion concerning the age at which children can be credited with having an understanding of biology. Some researchers have highlighted cross-cultural universals in children's ability to classify fauna into taxonomic categories (Medin & Atran, 2004). This has led them to argue that children are innately programmed to learn some forms of biology knowledge. They have suggested that a "folkbiology module" is the product of our evolutionary inheritance and has survival value for human evolution. It has been selected through evolution because it predisposes us to learn about prey and predators and safe and unsafe food sources. There is some evidence that there are different neurological systems for recognizing plants, animals and artefacts among adults (Kawashima, Hatano, Oizumi, Sugiura, Fukuda, Itoh, Kato, Nakamura, Hatano & Kojima, 2001). These theorists argue that children's specific theories of biology do not emerge early in development and has led to a debate about the timing of biology knowledge acquisition. Some researchers have argued that four-year-olds have biological concepts (e.g., Springer, 1999); whereas others argue that biological concepts are a relatively late developmental achievement (e.g., Carey, 1985; Solomon, Johnson, Zaitchik & Carey, 1996). These differences in view have arisen because researchers have often considered different biology concepts and have measured them in different ways (sometimes requiring the children to make judgments about biological outcomes and other times requiring verbal explanations of biological mechanisms). The issue of measurement will be dealt with in more detail in the 'existing measures' section below.
29. There is more agreement on the process of conceptual development in biology concepts. Carey (1985) and Inagaki and Hatano (2002) have argued that children's conceptual development in naïve biology proceeds through a process of analogy to humans. Children have extensive and salient experience of their own bodies and they use this knowledge to generate understandings of other animals. This process has been described as "comparison to people model" and "restricted personification model". It allows children to develop knowledge of animals' needs and the biological processes in animals. Thus, individual differences in experience, such as being ill or in pain, will provide children with a different basis for interpreting animals' needs. In addition to this process of analogy, children also learn a range of facts about animals from a variety of sources including formal education, the media (Williams & Smith, 2006), discourse (Hickling & Wellman, 2001; Tunnicliffe, 1996) and direct interaction with animals.

Existing measures of naïve biology concepts

30. Research on children's concepts tends to use interviews with vignettes describing a biological mechanism/process (e.g., contagion, growth) or outcomes (e.g., death, illness, inheritance). A vignette is a short scenario, often accompanied by a picture or photograph, which describes a character. For example, it might describe an animal with a baby (Springer & Keil, 1989) or a child who is experiencing an illness (Williams & Binnie, 2002). Children are then asked to predict a biological outcome and sometimes to also give an explanation of the biological process involved. Few standardised measures are available to examine naïve biology concepts and the tasks are usually designed to measure 4 to 7-year-olds' knowledge because of controversies over the timing of the onset of biology concepts (outlined above). Few

studies have examined the full age range from 4 to 15 years in specific areas of biology, with the exception of inheritance concepts (Williams & Smith, 2006; Williams & Smith, in press).

31. Children's drawings have been used within research to explore their knowledge of animals and human anatomy (e.g., Smith, Meehan, Enfieldt & Castori, 2005; Reiss, Tunnicliffe, Andersen, Bartoszeck, Carvalho, Chen, Jarman, Jónsson, Manokore, Marchenko, Mulemwa, Novikova, Otuka, Teppa & Van Rooy, 2002). Among older children, questionnaires have been employed to measure naïve and formal biology knowledge (Lewis, Leach & Wood-Robinson, 2000). These are sometimes designed to measure attainment in formal biology taught in schools.
32. Research has also examined parents' reports of children's concepts and knowledge through simple questionnaires (e.g., Nguyen & Rosengren, 2004). Similarly, Pine, Messer & St John (2001) surveyed teachers for their views of children's misconceptions in primary science, including biology.

Factors affecting knowledge uptake/conceptual development

Children's direct experience of animals

33. Pet ownership enhances children's understanding of animals, biology and animal care. Japanese research has demonstrated that experience of raising animals has an important impact on a range of biological concepts. For example, 5-year-olds who cared for fish over a two-week period showed higher levels of understanding in a range of biological concepts than 5-year-olds who had not cared for them (Inagaki, 1990). This finding has been replicated in relation to small mammals (Inagaki, 2001). Children who have companion animals within their families also have higher levels of understanding of complex biology concepts such as genetics and inheritance (Williams & Smith, 2006). Toyama, Lee & Muto (1997) have conducted the only study directly on children's understanding of animal care. They found that 6-year-olds who had participated in caring for animals in school had better knowledge of species-specific animal care procedures than children who did not participate in caring for the animals. Children with a stronger emotional tie to their pet have more ideas about the characteristics of their pet and how pets may be cared for (Melson, 1990).
34. Visits to zoos and museums have also been shown to have a positive impact on children's biology knowledge (e.g., Tunnicliffe, Lucas & Osbourne, 1997; Altman, 1998) and research on the cognitive benefits of city farms and caring farms is currently underway.
35. Finally, there is a body of evidence highlighting the importance of general proximity to nature and connectedness between children and animals (Kahn & Kellert, 2002; Lindemann-Matthies, 2005). This research shows that if animals are part of a child's immediate environment and cultural heritage (including companion animals, farm animals and wildlife), they will learn about them and accumulate a body of biological knowledge through a variety of learning processes based on their observations and interactions with animals. The more remote children are from animals, the fewer opportunities they will have to understand them.

The influence of age (developmental trends)

36. There is a wealth of literature on various aspects of children's knowledge of animals and biology that is directly relevant to their understanding of animal welfare and animal care. Key aspects of the literature are outlined below.
37. *Concepts of living things:* It has been described as a framework theory for naïve biology (as outlined above). Children as young as 4 years of age can distinguish

between living things and artefacts in terms of biological processes such as eating, growing and dying (Backscheider, Shatz & Gelman, 1993; Hatano, Siegler, Richards, Inagaki, Stavey & Wax, 1993). Jipson and Gelman (2007) recently examined 3, 4 and 5-year-olds' and adults' concepts of a variety of properties of living things. They used a more complex set of artefacts and animals including a robot dog, a stuffed animal, a sensor box, and a toy car, in addition to lesser-known animals (e.g., degu and starfish). Their findings supported previous studies in that distinctions between living things and non-living things on a range of properties were established by the age of four years. However, facial features were very important in the reasoning of 5-year-olds and adults in terms of non-biological properties. Furthermore, evidence suggests that including plants in a category of living things does not occur until after the age of 4 years (Stavy & Wax, 1989). Therefore, although the concept of living things is early to emerge in development, it continues to be refined throughout childhood.

38. *Concepts of animals:* Although children can distinguish animals from inanimate objects on the basis of a range of biological processes such as growth and reproduction (Jipson & Gelman, 2007), at four years old, children's concept of 'animal' is restricted and does not conform to the scientific biological concept of animal (Bell, 1981). Basically, young children classify as 'animals' creatures that are familiar and have fur, legs and move. Thus, for young children, mammals are clear examples of animals and through childhood they refine these classifications to include humans and non-mammals (see Carey, 1985). Research emerging from collaborations between developmental psychologists and anthropologists (e.g., Medin & Atran, 2004) has revealed remarkable cross-cultural similarities in children's classifications of animals (see below).
39. *Growth and nutrition:* Children have concepts of growth from approximately 3 years of age. Rosengren, Gelman, Kalish & McCormick (1991) showed that three-year-olds understand that animals grow bigger with age and not smaller (see also Inagaki & Hatano, 1996). Indeed, young children over-generalise this principal to species that undergo metamorphosis. Wellman and Johnson (1982) revealed that by the age of six, children considered that the amount of food consumed was associated with body size but that the quality of food was associated with health. Nguyen (2007) found that 4 and 7-year-olds' understanding of whether specific foods are healthy or not for humans was governed by their biological concepts of growth and health/illness.
40. *Illness knowledge:* There has been substantial research on children's concepts of illness. Early work by Bibace and Walsh (1980) found that young children's thinking about illness conformed broadly to Piaget's stage of intellectual development (e.g., Piaget, 1930). They argued that young children understood illness in magical terms. More recently, younger children's concepts of illness have been found to be clearly biological. Kalish (1996a; 1996b) states that four-year-olds have an understanding of contagion (that an illness is passed between individuals through a process of contact). Rozin, Fallon & Augstinini-Ziskind (1985) have also shown that preschool children understand that consuming a contaminated substance will lead to illness. However, Williams and Binnie (2002) and Myant and Williams (2005) have argued that children's understanding of illness is more complex and that young children have a series of concepts that become refined during childhood. These include concepts of contagion but also factual knowledge of non-contagious disease and experience-led knowledge of the causes and treatments of injuries and contamination. Much of this research has been conducted in relation to illness in humans. Further research is required to investigate children's understanding of illness symptoms, causation and prevention in animals.
41. *Inheritance knowledge:* Children's concepts of inheritance have attracted research attention because reproduction and inheritance are salient biological processes that clearly distinguish living and non-living things. Some of the research has asked

children about inheritance in animals (e.g., Springer & Keil, 1989; Williams & Affleck, 1999; Williams & Tolmie, 2000), while other studies have focused on inheritance in humans (Williams & Smith, 2006; Smith & Williams, 2007). A consistent finding is that children can accurately judge the outcome of inheritance by about 4 years of age but that verbalising an explanation that includes a biological mechanism of inheritance is a later developmental achievement (e.g., by the age of 7 years) (Solomon et al., 1996). This gap between judgments and explanations has led to children's concepts of inheritance being fragmented rather than theory-like (Williams, 2009). Finally, genetics concepts are not well understood even among older children and adolescents (e.g., Smith & Williams, 2007).

42. *Life and death:* Nagy (1948) reported that young children do not have a biological conception of human death. For young children, death does not constitute the final stage in a person's life, nor do children define death in terms of the cessation or breakdown in physiological processes (Carey, 1985). Young children often see the causes of death as external to the person rather than as an interaction between an external agent and physiological functioning (e.g., Safier, 1964; Koocher, 1974). It has been argued that only around the ages of 9 to 10 years do children conceptualize death in biological terms (e.g., Koocher, 1974). More recently, Slaughter, Jaakola & Carey (1999) have shown further limitations in young children's concepts of life and death in that the two concepts are not seen as being coherently linked until later in childhood, suggesting that children's concepts of death do not conform to a coherent biological theory. Further work on children's cognitive understanding of death in other animals is required.
43. *Animal needs and care:* Only one study has specifically examined children's understanding of animals needs. Myers, Saunders & Garrett (2004) interviewed 171 US 4 to 14-year-old children to identify their spontaneous concepts of their favourite animal's needs in a zoo context. They also used children's drawings to elicit information about animal needs. The results showed that 44% mentioned physiological needs; 23% included reproduction needs; 22% mentioned ecological issues, and 21% mentioned social needs. Other categories of response included: activity (12%); conservation (9.1%), and psychological needs (7.3%). There were age trends in children's concepts of needs. References to physiological need increased significantly with age. This type of concept increased between four and seven-year-olds and then stayed constant among 10-year-olds, slightly dropping between 10 and 14 years as children focused more on ecological needs. Ecological and conservation needs concepts increased with age. The authors argue that we can facilitate children's understanding of animal needs through enhancing their knowledge of ecology.

Gender differences

44. Gender differences have rarely been the focus of investigation in studies of children's naïve biology knowledge. However, where gender analyses have been reported, the findings have been mixed. In some studies (e.g., on illness knowledge) no gender differences have been found (Myant & Williams, 2005). In other studies, gender differences have been identified in knowledge of inheritance and reproduction. Girls have also been shown to have higher levels of understanding than boys (Williams & Smith, 2006). These reported gender differences are likely to be the product of differences in play interests and toys (e.g., dolls for girls), and family discourse about family relatedness (see Williams & Smith, 2006).

Ethnic and cultural influences (society/media)

45. There is substantial evidence that ethnic differences play a role in children's conceptual understanding of some aspects of biology (Coley, 2009). Ross, Medin, Coley & Atran (2003) found that Native American children had higher levels of understanding of the concept of living things than non-native Americans living in the

same geographical location. Both groups of rural children had greater understanding of living things than urban children. This study is important because it highlights not only close proximity to animals but also cultural heritage as important in developing biological concepts.

46. Ethnic diversity is evident in a variety of specific naïve biology theories and concepts. There are ethnic differences in categorising plants as living things (Hatano et al., 1993). Bloch, Solomon & Carey (2001) have found cross-cultural differences in children's concepts of inheritance. Panagiotaki, Nobes, Ashraf, Ikram and Lalji (2009) recently reported cultural differences between Caucasian and Pakistani children living in England and children growing up in Pakistan in their concepts of the human body, life and death.
47. Cultural differences in proximity to animals and cultural views of the connections between animals and people are likely to have an impact on the quality of knowledge regarding animals' needs and animal care.
48. Pagani, Robustelli & Ascione (2007) argue that "*socio-cultural and developmental factors are continuously interwoven*" in children's interactions with animals (p. 291). Citing findings from their earlier study (Pagani & Robustelli, 2005), they draw attention to teachers' perception that it is easy to play a protective and educational role with young children, but far more difficult with adolescents who are more influenced by socio-cultural factors (particularly when individualism, competitiveness and egocentrism are strong values in society).

The influence of geography (urban/rural residence)

49. Coley, Solomon & Shafto (2002) found that rural children have higher levels of biological knowledge than their urban counterparts. Similarly, Williams and Smith (2006) have demonstrated that children living in rural areas have a greater knowledge of inheritance and genetics than those growing up in urban areas in the UK.

Summary & implications for interventions to promote a DOC

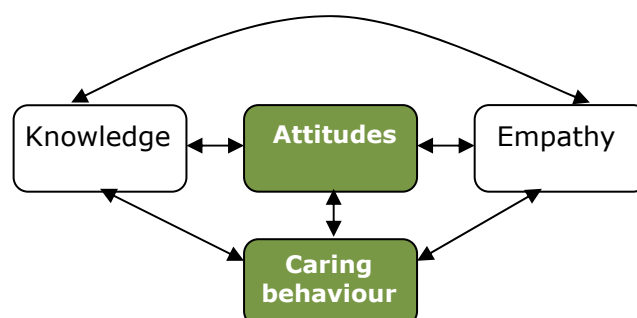
50. *Children develop a range of concepts relevant to DOC and animal needs prior to formal education. By the age of 3 to 4 years, they have some knowledge of basic life processes and associated physiological needs (e.g., growth and food) and are able to classify animals into broad groupings. This will inform their understanding of animal needs.*
51. *A range of naïve biology concepts develops through the primary school years. The evidence suggests that children between 7 and 12-years-old are particularly open to learning about animal needs and DOC.*
52. *Children's concepts of biological processes are often inaccurate or partial. Educational interventions are required to improve the quality and accurateness of the naïve concepts children hold.*
53. *There is evidence of gender, ethnic and cultural variations in naïve biology concepts. These will need to be considered in interventions to improve knowledge of animal needs and DOC.*
54. *Further research is required to explore children's understanding of biological processes in a range of animals in addition to humans in order to develop successful interventions and educational approaches. In particular, research is required on animals' needs and children's ability to understand differences in needs depending on species.*

II B: Children's attitudes and behaviour towards animals

Introduction

55. This section examines the current evidence base relating to:

- (a) children's attitudes to animals of different types,
- (b) their attitudes towards the use of animals, and
- (c) their caring behaviour towards animals.



With regard to (c), we are concerned with behaviours that arise from the presence or absence of knowledge or understanding, rather than those that constitute wilful harm and link to psychopathology and/or child abuse. There is a significant literature on deliberate cruelty towards animals that is beyond the scope of this review. However, a few key points from the cruelty literature are highlighted in Appendix 2.

56. We begin with a definition of 'attitudes' and highlight some key findings from the literature on adult attitudes, as they inevitably have a bearing on earlier development and demonstrate the influence of wider culture. Subsequently, we concentrate on what is currently known about children's attitudes and behaviour, linking evidence with findings from the adult literature where relevant. Finally, existing measures and factors influencing attitudes are considered, as well as the implications for promoting a DOC.

57. It should be noted that there are few UK-based studies; therefore any findings must be treated with caution in developing interventions based on this evidence. We provide more details on the UK studies given the objectives of the project.

What do we mean by attitudes?

58. *'Attitudes encapsulate positive and negative feelings, beliefs and behavioural information about all range of "attitude objects"' (Olson & Kendrick, 2008: p. 111) and 'conveniently summarize' how we feel about things (even when we know little about the object of interest). They are essentially 'precomputed evaluations... which allow us to navigate a bewilderingly complex world' (ibid), and are important because there appears to be a stronger relationship between attitudes and behaviour than between attitudes and knowledge (Prokop & Tunnicliffe, 2008).*

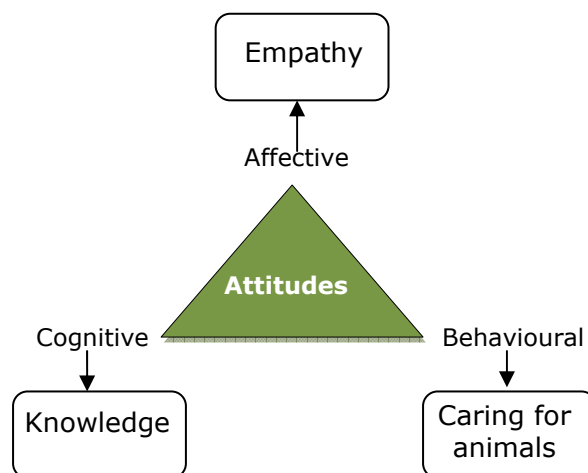
The origins of attitudes

59. There are multiple means by which we come to hold an attitude. Most theories of attitude formation distinguish between three sources and this is often referred to as the 'tripartite' approach. The model this provides is a useful way of illustrating the links between knowledge, attitudes and empathy (see Figure II B. 1). It distinguishes between different kinds of attitude *content*, while other approaches distinguish between different attitude formation *processes* (Olson & Kendrick, 2008). These are described below.

Attitude content: the tripartite model

60. Social scientists assume that responses express evaluation and therefore reveal people's attitudes. Such responses are divided into three classes: cognition, affect and behaviour (Eagly & Chaiken, 1993). The cognitive category contains thoughts that people have about the object (often conceptualised as beliefs or associations people establish between the attitude object and various attributes). The affective category encompasses feelings, emotions and moods in relation to the attitude object and the behavioural category includes people's actions with respect to the attitude object (the overt actions people exhibit). It has been argued that attitudes formed through direct experience tend to be affective, in comparison with those formed through indirect experience, which are often more cognitively-based (Millar & Millar, 1996).
61. In the same way some forms of biology knowledge are innate (see Section II A); there are also potentially **evolutionary origins** that might make us 'biologically prepared' to evaluate some objects favourably or unfavourably. '*Organisms that engage in behaviours that the environment rewards will be more likely to survive, reproduce and pass on genetic information to offspring*' (Olson & Kendrick, 2008: p. 121).

Figure II B. 1: How attitudes link to knowledge and empathy (tripartite model)



Attitude formation processes

62. Attitudes are generally thought to form 'explicitly' through a deliberate, thoughtful consideration of attitude-relevant information (see Part II A), or 'implicitly' through less effortful processes that occur outside of conscious awareness and may therefore be considered automatic determinants of social behaviour.
63. According to Rudman (2004), direct observation of others early in life, experiences that are primarily affective (i.e., engage the affective centres of the brain), cultural biases (prejudices of our culture) and internal cognitive pressures to be consistent (i.e., hold beliefs and attitudes that agree with one another) are the key sources of implicit attitudes. Bowd's (1989) description of the concerns of an elementary teacher in Japan illustrates this well. Concerned about her (urban) pupils' lack of knowledge about the role of animals as human food, she decided to investigate their current understanding and provide information about and contact with chickens. Children believed the packaged meat bought from supermarkets to be manufactured products and abhorred the prospect of eating chicken for lunch after observing and playing with one and being informed about the meat production process. Therefore, intervention at the cognitive and behavioural level (through provision of knowledge

and direct experience) influenced children's attitudes through the affective route (see Figure II B.1).

64. Before continuing to examine the literature relating to children's attitudes, the next section highlights some key points raised by the adult literature.

The literature on adults' attitudes towards animals

65. There is a significant amount of literature on attitudes towards animals and animal use among adults and increasing recognition of the underlying structure of these attitudes. Within this literature, it is generally agreed that there are two primary motivational determinants: one relates to 'affect' (people's affective and/or emotional responses to animals) and the other to 'utility' (perceptions of animals' instrumental value). Indeed, the clash between the affect and utility dimensions is said to account for many of the tensions and paradoxes that arise in our relationships with animals (Serpell, 2004). Arluke's (1988) study of workers' attitudes of laboratory animals exemplifies this contradiction. At the same time as lab workers identified with the animals (through caring for them), they also tended to objectify them (to maintain a clear conscience about subjecting them to experimental procedures).
66. Kellert and Berry (1987) argue that differences in male and female adult attitudes are so dramatic and consistent that gender has to be considered one of the most important demographic influences. These are highlighted in Table II B. 1 (nine empirically-derived values towards animals).

Table II B. 1: Kellert's (1980) classification of attitudes towards animals

Attitude	Definition	Gender difference
Humanistic	Primary interest and strong affection for individual animals, principally pets.	F>M
Moralistic	Primary concern for the right and wrong treatment of animals, with strong opposition to exploitation or cruelty toward animals	F>M
Negativistic	Primary orientation an avoidance of animals due to indifference, dislike or fear	F>M
Naturalistic	Primary interest and affection for wildlife and the outdoors	M>F
Ecologistic	Primary concern for the environment as a system, for interrelationships between wildlife species and natural habitats	M>F
Scientistic	Primary interest in the physical attributes and biological functioning of animals	M>F
Utilitarian	Primary concern for the practical and material value of animals or the animal's habitat	M>F
Dominionistic	Primary interest in the mastery and control of animals, typically in sporting situations	M>F
Aesthetic	Primary interest in the artistic and symbolic characteristics of animals (no valid scale developed)	

F>M (females score more strongly on this dimension than males); M>F (males score more strongly)

67. According to Kellert (1980), females tend to have stronger humanistic and moralistic attitudes than males. However, they are also more likely to have negativistic attitudes (i.e., be scared of or dislike certain types of animal). Males are more likely be interested in wildlife and the outdoors (naturalistic) and engage in more animal-related leisure pursuits (Bjerke, Kaltenborn & Odegardstuen, 2001), yet their interest appears to be less affective than females. They appear to be drawn to the ecological significance of animals, are more interested in biology and habitat and are more likely

to view animals in terms of their utility and as something to control or master. Gender differences are discussed further later in this section.

68. Interestingly, adults tend to keep the same kinds of pets that they had as children (Serpell, 1999) and strong associations have been found (from retrospective studies) between childhood pet keeping and humane attitudes in adult life. This suggests that childhood experiences are extremely important. However, the important predictors of adult humane attitudes are the type of pet and its individual importance to the child (Paul & Serpell, 1993).

Children's attitudes towards different types of animal

69. A useful distinction shaping our attitudes has frequently been drawn between companion or pet animals, farm animals and wild animals. This distinction suggests that the ways in which humans use, represent and interact with different types of animal result in different attitudes. This section highlights key findings from the literature on children; most of which emanates from the USA and looks specifically at pets. Existing evidence suggests that children's attitudes to animals may be predominantly aesthetic to begin with. Desmond Morris made this point following his survey in 1960, noting that '*the top ten favourite animals all have humanoid features; they are mammals, with large eyes, rounded faces and cuddly bodies*' (cited by Paterson, 1989: p. 61). Experience with the animal in question is clearly important in the development of positive or negative attitudes; therefore less familiar animals may trigger fear. This emotional response is discussed below and further in Section II C.

Pet animals

70. Animals that are typically kept as pets tend to be viewed more favourably than other animals. A key study investigating children's attitudes towards their pets, using the tripartite model (Kidd & Kidd, 1985), found that 99.3% of 3 to 13-year-olds said they wanted a pet, with 57% reporting that they preferred dogs to other pet animal types.
71. In one of the few UK studies, companion animals were mentioned frequently by children participating in two qualitative studies by Morrow (1998); the first on definitions of family and the second on involvement in family decision making and work. Of the 55 8 to 11-year-old children in the first study, 62% referred to pets in one of three tasks designed to assess who was important to them and how they defined 'family'. Themes that emerged were: playfulness of their pets; love and affection their pets provided, and pets being part of the family. Ten to 11 year-olds were more expansive and more likely to talk about their pets' dependence on them than the other way round. The notion of 'trust' was also invoked. Pets were seen to listen and have perceptive abilities, being able to detect when something was wrong. There was also pride (mostly among boys) in keeping pets alive beyond their life expectancy. Among 12 to 15-year-olds, 28% of the 191 children spontaneously mentioned their pets when writing about their lives outside school. Uncritical support was a theme, but responsibility, independence and social interaction were deemed important aspects of pet ownership.
72. Melson (2001) suggests that involvement with pets may be a positive or negative indicator of children's well-being. Children may turn to pets at particular times and an over-reliance could indicate problems within other relationships. One 9-year-old girl in Morrow's (1998) paper is quoted '*I can play with her when I have nobody else to play with, and when I am upset I go to play with her*' (Morrow, 1998: p. 221). This raises the question of the consistency of care children provide and the ways in which families disaggregate responsibilities (see Section III A). In a sample of 12 to 17-year-olds, the absence of siblings in the household, having sole responsibility for

one's pet and owning a cat or dog were associated with higher levels of pet importance (Siegel, 1995).

Farm animals

73. A search on Web of Science with the keywords "child* AND attitude* AND farm AND animal*" generated 35 hits, most of which were concerned with diseases and hazards associated with farms. There were no articles directly investigating the attitudes of children towards farm animals. This is surprising given young children's familiarity with this type of animal through TV programmes, books and nursery rhymes. One study has shown how farm animals were effectively used as therapeutic aides with children in residential treatment (Mallon, 1992; 1994).

Wild animals

74. Again, as with studies of attitudes towards farm animals, few studies relating to wild animals could be found. Prokop and Kubiak (2008) found that children aged 10 to 11 had more positive attitudes towards prey animals than predators, whereas there was no difference among children aged 12 to 15. Other studies suggest, as highlighted above, that there may be a gender bias in attitudes toward wild animals. One study on children's attitudes reported that boys in grades 1-12 (age 6 to 18) were more inclined to rank fish, reptiles and biting and stinging invertebrates as more appealing than did girls (Badaracco, 1973).
75. Sobel (1996) argues that opportunities for experiencing the natural world are decreasing at an alarming rate and that this can lead to ecophobia (the fear of ecological problems and the natural world). As many young children have very little actual contact with living things (Cohen & Horm-Wingerd, 1993), unfounded fears and misconceptions about nature tend to develop early in life (see 'The influence of direct experience in Part II A). This is exacerbated by the preponderance of myths in media representations of particular animals (Prokop & Tunnicliffe, 2008) (see 'ethnic and cultural influences').

Children's attitudes towards animal use

76. One UK study investigated the attitudes of secondary school children (age 11 to 16) to various uses of animals (in clothing, for recreational purposes, in teaching and research, for conservation and food) (Stanisstreet, Spofforth & Williams, 1993). Approximately three-quarters of the pupils surveyed thought it was wrong to kill animals to make clothing (although far few objected to the wearing of leather shoes and jackets – i.e., where no mention was made of an animal being killed). Few pupils objected to keeping animals as pets but more thought it was wrong to keep them in zoos and even more to keep birds in cages. More than half objected to the use of animals in circuses. A large proportion felt it was wrong to experiment on living animals with more than half objecting to it even if it had the potential of advancing medical care and nearly half felt dissection was wrong. By contrast, under half of the pupils responded positively to statements about the conservation of animals and nearly one-fifth thought conservation was a 'waste of time'. Finally, over one third of pupils felt it was wrong to kill animals for food, one third thought that meat was an essential component of a healthy diet and very few pupils objected to eating animal products. By contrast, three quarters of pupils objected to intensive farming methods. The coincidence of generally sympathetic attitudes towards animals and the lack of positive attitudes towards their conservation in this study led the authors to conclude that the environmental 'green' lobby has been less successful in influencing opinion than have 'animal rights' organisations, at least with teenagers.
77. Wells and Hepper (1995) also examined the attitudes of secondary school children (age 11 to 15) in Northern Ireland towards two groups of issues involving the use of

animals; those that usually lead to the death or injury of the animal (e.g., fox hunting, deer hunting, hare coursing, dog fighting, use of animals in non-medical and medical research) and those that usually do not directly cause injury or death (e.g., dog racing, dog shows, pigeon racing, horse racing, show jumping, use of animals in circuses and zoos). Results indicated a greater concern among children with activities that led to the animal's death. Dog fighting was the most highly disapproved of use. Greater concern was expressed over the use of animals in circuses than zoos.

78. Within the adult literature, a belief in animal mind (a term used for how we attribute to animals mental capacities such as intellect, the ability to reason, and feelings of emotion) has been identified as a powerful and consistent predictor of attitudes towards animal use (Knight, Vrij, Cherryman and Nunkoosing, 2004). When people do not believe animals to be capable of thinking and feeling, they are more inclined to support animal use (Herzog and Galvin 1997). Pet owners rate examples of animals used in research as less acceptable than non-pet owners (Driscoll, 1992). Similarly, Paul and Serpell (1993) found that adults involved with pets in childhood showed more concern for animal welfare, were more likely to be vegetarians and/or members of animal welfare groups than adults who had no involvement with pets during childhood.
79. According to Paul and Podberscek (2000), belief in the sentience of animals is part of the cognitive component of attitudes towards animal welfare, but we also need to measure the emotional constituent (people's emotional empathy with animals – see Section II C).

Children's caring attitudes and behaviour towards animals

80. Melson (2001) reports that children readily express concerns and worries about their pets' welfare and that attachment to pets is often correlated with animal welfare and environmental/ecological sensitivity. However, there are very few studies that shed further light on children's caring attitudes and behaviour towards animals.
81. In spite of the limited research in this area, there is some evidence of gender differences in caring behaviours. Morrow (1998) found that it was nearly always girls who described 'looking after' pets, in comparison with boys 'doing things' with their pets. She argues that *'the way in which children perceive and describe pet care is likely to be influenced by cultural expectations which encourage certain kinds of behaviour...girls are expected to be nurturing and may respond accordingly in their relationships with their pets'* (p. 225). On the other hand, Melson and Fogel (1996) argue that caring for animals is 'gender neutral'. They asked parents of children aged 5 to 12 years of age to fill out a questionnaire where they were asked to rate the frequency of time their child devotes to playing and caring for their pet. There were no significant differences between girls and boys.
82. The discrepancies between these two studies can be explained by a tendency for girls to be more likely to report looking after their pet. Alternatively, relatively high investment in pet care may reflect a greater orientation toward household and family responsibilities (Melson & Fogel, 1996), suggesting that *'gender differences in nurturant behaviour are restricted to those targets that are linked to gender-role expectations'* (p. 103). Cleaning out animals, for example, may be viewed as a female rather than a male task (see Section III A).

Existing measures of attitudes/behaviour

83. Very few studies have investigated self-reported relationships between children and animals in the UK (their attitudes, empathy and treatment of animals). Most studies

emanate from the US; therefore this needs to be borne in mind in assessing and utilising the literature to develop UK-based interventions.

84. Most studies of attitudes tend to use self-report surveys; several scales of which have been used repeatedly (e.g., the Pet Attitude Scale (PAS) and the Companion Animal Bonding Scale (CAB)). Table II B. 2 provides a summary of the measures used in quantitative surveys.
85. Concerns have been expressed over a tendency to respond in socially-desirable ways to questions on attitudes toward pets. This has led to the use of multiple measures, including observation in order to improve reliability (Lago, Kafer, Delaney & Connell, 1988). However, self-report measures are an essential tool, particularly in evaluating educational programmes. *'Such self-reported statements represent the only operational means of understanding the important cognitive structures that different individuals have about their pets'* (p. 244).
86. A number of problems have also been identified with the use of instruments that measure people's attitudes to animals in general rather than attitudes towards a particular species. Miura, Bradshaw & Tanida (2002) noted that some respondents may be thinking about dogs while they are responding, while others may be thinking about birds. Moreover, some of the questions in pet attitude surveys include items that pertain to specific roles or interactions with animals (such as protection and exercise, which are most likely to be provided by dogs). As a result, owners of these animals tend to score higher than owners of other types of animals (Zasloff, 1996).
87. It is also important to note that attitudes assessed implicitly appear to shift according to consistency principles more than those assessed explicitly by traditional questionnaires. Thus, *'the explanation we provide for a given attitude may be more a post hoc justification for an attitude that already exists and less an articulation of the attitude's underlying basis'* (Olson & Kendrick, 2008: p. 120).
88. Qualitative work within the UK has prioritised children's own understanding and interpretation of their relationships, including their attitudes (e.g., Morrow, 1998). However, there are few such studies. There are a few studies that assess children's behaviour, either through observation or parental reports of their children's interactions. Analysis of attitudes is perhaps assessed most accurately within a wider context in which different aspects of children's relationships with animals are explored. Existing studies have tended to examine different issues separately using one method.

Factors that influence attitudes/behaviour

Children's direct experience of animals

89. Throughout this section, we have highlighted the influence of direct experience (particularly with pets) on the formation of attitudes. Positive correlations have also been found between childhood experience with animals and positive attitudes towards animals later in life. A few studies have drawn attention to the extent of pet ownership in the UK, suggesting that British people tend to have more childhood experience of animals than people in other countries. Miura, Bradshaw & Tanida (2002) found that British students had more childhood experience, more positive attitudes to animals and a greater interest in animal welfare issues than Japanese students. Experience with animals is perhaps the strongest influence on their attitudes; therefore educational programmes need to recognise that children have not necessarily had positive encounters.
90. It is also important to recognise that experience with, and attitudes towards, animals are most directly influenced by the family and this is a significant omission within the child-animal interactions field.

Table II B. 2: Existing measures of attitudes/behaviour towards pets, animals and animal-related activities

Type of material measured	Scale	What the scale measures	Authors	Age group assessed	Key findings/conclusions
Children's attitudes to animals	Attitudes toward animals	Children's attitudes towards animals and relationship with them	Kellert (1985)	Children	Measures humanistic, moralistic, utilitarian, negativistic, dominionistic, naturalistic and ecologicistic attitudes
	Attitudes to dogs for 4-year-old children and adults	Children's attitudes towards dogs	Lakestani (2007)	4-year-old children and adults	9-items scale measuring attitudes to dogs
	Children and Animals Assessment Instrument (CAAI)	Assessment of cruelty to animals in children	Ascione, Thompson & Black (1997)	Children in day treatment and residential programs for emotionally disturbed youth, incarcerated adolescents, and children accompanying their mothers to shelters for battered women	Children and Animals (Cruelty to Animals) Assessment Instrument (CAAI), for use with children over 4-years-old and their parents, to obtain information on animal maltreatment
Adults' attitudes to animals	The Pet Attitude Scale (PAS)	Adults' attitudes toward pets	Templer, Salter, Dickey, Baldwin & Veleber (1981) Modified by Munsell, Canfield, Templer, Tangan & Arikawa (2004)	Kennel workers & social work undergraduates Undergraduates	18-item scale assessing the favourableness of attitudes towards pets. It measures 3 aspects of attitudes to pets:(1) love and interaction; (2) pets in the home, (3) joy of pet ownership
	Attitudes towards dogs in adults	Adults' attitudes towards dogs	Miura, Bradshaw & Tanida (2002)	Undergraduates	46-items scale measuring Japanese and British undergraduates' attitudes to dogs
	Animal Attitude Scale	Adults' attitudes towards the treatment of animals	Herzog, Betchart & Pittman (1991)	Undergraduates	29-item scale investigating the tendency to become involved with animal welfare and measures attitudes towards treatment and use of animals

Type of material measured	Scale	What the scale measures	Authors	Age group assessed	Key findings/conclusions
	The Pet Attitude Inventory (PAI)	Adults' attitudes and attachment towards pets	Wilson, Netting & New (1987)	The elderly/foster grandparents	50-item scale assessing ownership characteristics, attitudes and attachments drawn from earlier work by Ory and Goldberg (1983) and Bustad (1980)
Adults' attitudes and attachment to animals	The Pet Inventory Assessment	Adults' attachment levels, attitudes toward ownership, and social interaction	Ory and Goldberg (1983)	The elderly	This inventory gathers information on the presence of a pet in the household, the type of pet, and the degree of attachment to the pet by the owners
	The Pet Relationship Scales	Adults' favourable attitudes and affectionate relationships with pets	Lago, Kafer, Delaney & Connell (1988) Kafer, Lago, Wamboldt & Harrington (1992)	Elderly volunteers and undergraduates	22-item questionnaire developed to measure favourable attitudes and affectionate relationships with pet animals in adults
	The Miller-Rada Commitment to Pets Scale	Adults' commitment to pets	Staats, Miller, Carnot, Rada & Turnes (1996)	Undergraduates and their friends or relatives	Commitment to pets in the context of the definition of commitment as a willingness to expend effort or resources. Questions ask if they would keep a pet if various health, behaviour or financial problems occurred at different pet ages
Children's cruelty toward animals	Boat Inventory on Animal-Related Experiences (BIARE)	An inventory designed to determine if an individual's history includes animal-related events involving trauma, cruelty, or support	Boat (1994)	Children	The BIARE-Boat Inventory on Animal-Related Experiences was created to be used for screening and information-gathering. Included are questions concerning the following areas: pet ownership history, experiencing animals as a source of support, loss of animals, cruelty to animals, killing of animals, animals used to coerce/control a person, sexual interactions with animals, and animal-related fears

The influence of age (developmental trends)

91. A number of papers highlight a decline in pupils' interest in animals with age (Bjerke, Odegardstuen & Kaltenborn, 1998; Prokop & Kubiak, 2008), suggesting that 'natural' predispositions may give way to socio-cultural influences. Early research on children's attitudes in the US, suggested that children (6 to 10-years-old) are harsh and exploitative in their beliefs about animals (Kellert, 1985); an ethical concern for the treatment of animals increasing dramatically between 10 and 14. By contrast, British results from the same time as this US study, suggest earlier emotional involvement and sensitivity in children (Paterson, 1989).
92. With regard to attitudes towards animal use within the UK context, Stanisstreet, Spofforth & Williams (1993) found that pupils aged 11 to 12 years appeared to be more sensitive about a number of issues than older pupils: killing animals for their skins and wearing leather clothing; using animals in medical research, for dissection and teaching and testing cosmetics. However, according to Wells and Hepper (1995), citing previous US research (Kellert, 1985; Driscoll, 1992), 13 to 16-year-olds have been found to be particularly interested in the welfare of animals. Driscoll's study found adolescents between 14 and 19 rated different examples of animal research as less acceptable than subjects between 20 and 29 and 50 and 59 years. Therefore, it is possible that positive attitudes towards animal welfare issues decline progressively after leaving school.
93. In their Italian study, Pagani, Robustelli & Ascione (2007) highlight a tendency for children between 9 and 10-years-old to be more compassionate towards animals (especially in their attitudes toward zoos, use of animals in circuses, use of furs and leather clothes and witnessed animal abuse) and to be less afraid of animals than older pupils. They explain these findings in terms of socio-cultural factors (i.e., greater role of elementary schools and animal welfare educational interventions in promoting children's respect for animals).
94. Kellert (1985) suggests that children move through three developmental stages (from exploitative responses to emotional and finally to ethical) and that these need to be taken into account in the design of educational programmes. Exploitative attitudes need to be addressed through curricula that are affective; emotional orientations need to be bolstered with factual information and ethical concerns addressed through ethical/conservationist education.

Gender differences

95. It has been argued that girls have more positive attitudes toward horses and are more pet-orientated than boys, while more boys prefer wild animals (Bjerke, Odegardstuen & Kaltenborn, 1998). Boys tend to have greater knowledge of animals, while a more aesthetic and anthropomorphic orientation appears to be more typical of young girls (Kellert & Berry, 1987).
96. The family context is likely to be an important influence in terms of gender-based role models. These are often culturally determined (see 'ethnic and cultural influences'), as evidenced by cross-cultural differences in studies that examine similarities in the attitude scores of children and their parents. Male students were more influenced by their fathers and females by their mothers in Raupp's (1999) study; higher correlations between adolescents' and mothers' attitudes were found in a US study (Schenk, Templer, Peters & Schmidt, 1994) and Al-Fayez, Awadalla, Templer & Arikawa (2003) found the opposite (fathers' influence being stronger) in a Kuwaiti study. These results highlight cultural patterns related to gender and perhaps maternal/paternal roles that are prevalent in particular countries (see below).
97. With regard to attitudes towards animal use, Wells and Hepper (1995) report that males disagreed less with different uses of animals than females, leading them to

argue that if this is indicative of different cognitive and emotional orientations towards animals, orientations are well established by 11 years of age. Girls were described as more 'sympathetic' than boys in Stanistreet, Spofforth & Williams' (1993) study, with more girls thinking it was wrong to wear leather clothing, keep birds in cages, test cosmetics on animals, kill animals for food and keep chickens in battery cages. These findings accord well with findings from the adult literature, where women and men are said to value animals for fundamentally different reasons and the sexes contrast considerably in their interests and satisfactions derived from animals (Kellert & Berry, 1987).

98. Among adults, females score higher on humanistic attitudes, express far stronger emotional attachments to particular animals (particularly pets and attractive animals) and are more likely to reveal anthropomorphic feelings. They score higher on the moralistic attitudes scale, revealing greater concern over animal welfare issues and less support for the exploitation of and dominance over animals (DeRosa, 1984). However, women also show less positive attitudes toward wild animals than men and express more fear and indifference towards all animals, particularly in relation to wildlife. By contrast, males score higher on the utilitarian and dominionistic attitude scales, revealing a tendency to derive personal satisfaction from the mastery and control of animals. They are more likely to award a positive rating to predatory animals, invertebrates or game animals (Kellert & Berry, 1987). Men are also far more likely to participate in wildlife recreation, especially activities that involve consumptive use (hunting, trapping, and fishing). Greater numbers of men work in wildlife and other natural resource professions and they appear to have greater knowledge of wildlife, whereas a much greater degree of anti-hunting and anti-trapping sentiment is apparent among women.
99. Consistent with these findings, male adults have been found to have lower levels of belief in animal mind (a strong predictor of attitudes towards animal use) compared with females (Herzog & Galvin 1997). This has been explained by a male predisposition to spontaneously 'systemize' and be more interested in 'facts' rather than 'relationships'. Females are the opposite; more likely to spontaneously 'empathize' (Baron-Cohen, 2003). Nonetheless, this does not negate the influence of a desire to comply with cultural patterns related to the role of females or males (Pagani, Robustelli & Ascione, 2007). Cultural compliance may lead girls to *appear* more humane and empathic than boys and boys to be more likely to be perpetrators of animal abuse.

Ethnic and cultural influences (society/media)

100. We tend to acquire the attitudes/preferences of our culture at an early age through passive socialisation and without our awareness or conscious consent (Rudman, 2004). Therefore, implicitly formed attitudes can be ones with which we do not agree at an explicit level (Banaji, 2001). We might eat meat, for example, but when we reflect on the idea of producing and killing animals for humans to eat, we may feel it is wrong. Accordingly, at a basic level, our early attitudes towards animals are likely to be shaped implicitly by the ways in which the culture to which we belong uses and represents animals.
101. At the same time, in Western cultures, adults assume there are benefits to children of having pet animals and that there is a natural affinity or bond with animals. As such, animal representations are introduced into all aspects of a child's life (from soft toys and clothing to literature, TV programmes and films). However, *'adult society may have constructed an idealized world of childhood populated by "animal friends" that bears only limited relation to children's spontaneous or unindoctrinated perceptions and inclinations about animals'* (Serpell, 1999: p.88). Indeed, the idealisation of animals within childhood may continue into adulthood and may explain the significant number of failed animal adoptions. According to Anderson and Henderson (2005),

distorted representations manifested in childhood, may unconsciously influence adult behaviour and engender impossible expectations for actual animals.

102. Children's stories often misrepresent animals, primarily through anthropomorphism; a dissolving of the human-animal distinction and creation of heroic characters. However, portrayals of animals are not universally positive. Different species and habitats are imbued with particular characteristics. Young children, for example, tend to be '*more familiar with wild places through stories about witches and wild beasts than through direct experience*' (Chawla, 1988: p. 15), thus leading to unfounded fears and misconceptions about nature. Dogs have been described as one of the most prominent examples of media distorted animals (Anderson & Henderson, 2005).
103. Media portrayals imbue certain animals with characteristics that make them more worthy of care and respect than others (Lerner & Kalof, 1999). As Paul (1996) argues, while cruelty to mammals tends to be explicitly admonished in TV programmes, fish and invertebrates are excluded from moral concern and any discussion or depiction of animals as meat is avoided. Farm animals tend to occupy minor roles and the origins of mammal meat are heavily disguised or treated as a joke. Children's realistic animal stories also tend to '*go against the grain of our traditional moral order that places humans and other animals in a hierarchical relationship*' (Johnson, 1996: p. 14). 'Phobic animals' (spiders, bats) are depicted in horror films and the "realism" of computer-generated images may contribute to perception that they are realistic, even though they are not (Frank, 2003, cited by Prokop and Tunnicliffe, 2008). Importantly, in intervention terms, myths (often perpetuated about less popular animals) are often '*tenacious and resistant to change by conventional teaching strategies*' (Prokop & Tunnicliffe, 2008: p. 89).
104. The treatment of animals (in positive or negative ways) is often justified in terms of religion. However, in many monotheistic religions, Menache (1997; 1998) argues that animals are often portrayed in contradictory ways. Both positive and negative attitudes towards dogs are evident in Jewish, Christian and Islamic texts. However, attitudes appear to have become increasingly positive over time.
105. Attitudes towards companion animals have been found to be less positive in Muslim countries than in the United States or Western cultures (Al-Fayez et al., 2003), where animals tend to be viewed in terms of their economic rather than their emotional value. Dogs, for example, though often considered 'dirty' in Islamic religion, are often kept as guard dogs or used for hunting. Nonetheless, Islamic scripture emphasises the protection of animals, for example, in terms of humane slaughter and the use of animals as targets or in blood sports (Masri, 1989). Pet ownership is less common, perhaps explaining why animals were never discussed by the 44 pupils who were of Pakistani origin in Morrow's (1998) study. This was a key finding, given that pets were frequently mentioned by the other children. Al-Fayez et al.'s (2003) study of attitudes towards companion animals in Kuwait, found a stronger correlation between the attitude scores of adolescents and fathers rather than mothers, consistent with the more dominant role of men in Arab countries.
106. One study highlights how a strong sentimental attitude toward animals that is evident in some cultures can actually lead to pets receiving inadequate care. Drews (2002) explains how Costa Rican adults are so keen on animals that they acquire wild animals as pets. The aesthetic appeal of the animal, compassion, affection and a desire to please and stimulate children were described as important motives for doing this. However, although Drews found that adults who keep wildlife have better biological knowledge than those who have not, their empathy appears to be misguided as it does not necessarily translate into more animal-friendly practices.

The influence of geography (urban/rural residence)

107. Very few studies have compared the attitudes of children living in different locations (urban/rural comparisons, for example). One Norwegian study reports that children living in urban areas appeared to like animals more than rural respondents; a finding that applied to the large carnivores in particular (Bjerke, Odegardstuen & Kaltenborn, 1998). One North American study showed that children from rural backgrounds had greater knowledge of animals than their urban counterparts (Kellert, 1985). Another study reported that children from urban areas expressed more concern towards more of the uses of animals than children from rural settings (Wells & Hepper, 1995).

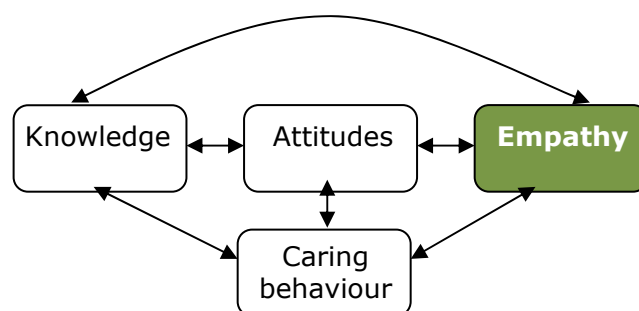
Summary & implications for interventions to promote a DOC

108. *Children's attitudes towards animals appear to be aesthetic to begin with and there is great enthusiasm for having/getting a pet. However, it is not clear what role children and young people place in caring for their pets and interest in animals appears to decline with age. Early intervention may be necessary to prevent hardening of attitudes and disrupt misconceptions. However, interventions might also usefully target the 'dropping off' point (secondary age pupils) in order to re-engage young people's thinking about responsibility.*
109. *Little is currently known about the mechanisms by which children's attitudes towards animals translate into particular behaviours. The nature of the relationship between the child and animal is likely to be critical and a reliance on animals to fulfil the child's own needs is an important issue to address. To what extent are children aware of the importance of continuity of care for the animal?*
110. *There are very few studies on attitudes towards farm or wild animals, although ecophobia appears to be present (likely to be due to lack of direct contact and preponderance of myths within the media).*
111. *Studies on children's attitudes towards animal use reveal generally sympathetic views (girls more sympathetic than boys), with the exception of the need for conservation. More concerns are expressed about activities that lead directly to the animal's death and secondary school age children appear more interested in animal welfare (issues relating to cruelty and exploitation). Interventions might usefully focus on this to reach this age group.*
112. *While behavioural studies suggest that caring for animals is gender-neutral, the impact of gender roles within the family and wider society is important. It is probable that parents play a significant mediating role through their own behaviour and expressed attitudes as well as their education of children in relation to pet needs and human responsibilities. High investment in pet care may also reflect a general orientation to household and family responsibilities. Interventions may need to be tailored in line with boys' and girls' interests and challenge the existence of gender roles in relation to caring activities.*
113. *Focusing on the feelings of the animal (through direct contact or observation) may provide a useful focus for changing negative or inconsistent attitudes, while knowledge provision is necessary to address false beliefs developed through implicit means (idealisation, cultural attitudes/predispositions, proliferation of myths). Awareness of media influence may be important in this regard.*

II C: Children's emotional reactions (empathy and attachment)

Introduction

114. In previous sections we have considered children's understanding of animals and their attitudes/behaviour towards them. This section examines children's empathy and their emotional attachment to animals. We review the literature that examines the assumption that when children have an emotional attachment to an animal and an empathic understanding of them, they interpret an animal's needs more accurately and are better able to care for them.



115. This section starts by defining empathy and attachment in general and in relation to pets. To demonstrate the closeness of relationships between children and their pets, we then consider pets' role in families. Negative emotional reactions to animals are also discussed in relation to fear. Subsequently, existing measures of empathy and attachment are reviewed and attention drawn to those that could be used to investigate children's notion of DOC for animals. Finally, influences on empathy and attachment are examined.

116. Because the literature on children's empathy towards *animals* is very scarce (only one study by Poresky, 1990 - see Table II C. 1), the literature on children's empathy toward humans and adults' empathy toward animals and humans will be presented. In this way, we will attempt to build a general picture of empathy towards animals that may generalise to children.

What do we mean by empathy and attachment?

117. There are two key types of empathy. Cognitive empathy is an ability to understand another being's feelings and viewpoint (Borke, 1971). By contrast, affective empathy is an emotional response to perceived emotional experiences of others, including animals (Meharabian & Epstein, 1972). Thus, an empathic person can accurately predict and recognise another's feelings *and* share these feelings (Meharabian & Epstein, 1972). Empathy develops over time and can be viewed as a learned behaviour (Eisenberg, 1982; Richardson & Norman, 2000).

118. Attachment is a '*lasting psychological connectedness between human beings*' (Bowlby, 1969). Much of the work on attachment has focused on children's attachment to their parents. In this review, however, we focus on children's attachment to their pets.

119. Melson, Peet & Sparks (1991) argue that the relationship between attachment to pets and empathy (towards humans) is complex and dependent on the age and gender of the child, as well as the method of assessing empathy.

Attachment and pets as family members

120. There are three assumptions underlying psychological accounts of child-companion animal relationships: (1) the child-pet relationship mirrors the parent-child relationship and children view pets as an extension of themselves, (2) caring for a pet functions to socialise children into caring adults, and (3) pet ownership in

childhood has universal characteristics and functions, disregarding what is known about cross-cultural differences (Morrow, 1998; Siegel, 1995).

121. The importance of pets within the family, and as a consequence, the intensity of children's attachment to their pets, is illustrated by the fact that 98-99% of children aged 3 to 13 years identify their pets as family members (Beck & Katcher, 1983). Children describe their pets in ways that suggest they provide different kinds of support from the people in their lives. They appear to endow animals with perceptive abilities, often feeling that they 'know' when something is wrong (Morrow, 1998). In a similar vein, Davis and Juhasz (1995) found that preadolescent dog owners generally perceived their dogs as very much like a person and believed that the animals liked them very much.
122. A survey dating from 1903 by Bucke on children's school essays about pet animals demonstrated that dogs were very popular (Hart, 1995). The children reported that they enjoyed the dog's ability to express love and affection by jumping up, running around, wagging its tail and soliciting play. Many also appreciated the dog keeping them company and played with them when they were feeling lonely or sad. In another study, dog owners were asked to represent their significant relationships pictorially using a technique called the Family Life Space Diagram. Over one third of the owners placed the dog closer to themselves than any other family member (Barker & Barker, 1988).
123. In some cases, strong attachment to pets may be a disadvantage because children may rely more on their animals and see them as a comfort blanket instead of (always) responding to the animal's needs. Melson (2003) suggests that the frequency of time spent with a pet may be a compensatory outlet when others are unavailable, as for example, when a child does not have a younger brother or sister. This appears to be important beyond early childhood too, as Davis and Juhasz (1995) suggest that pets help preadolescents feel less lonely.

Fear of animals

124. According to Serpell (1999), fear of animals is widespread in childhood; second only in frequency to fear of the dark. It is often acquired by vicarious learning (Askew & Field, 2007) and triggered by specific parental disgust reactions. For example, De Jong, Andrea & Muris (1997) found that the mothers of spider-phobic girls usually had a strong disgust of spiders. Fear also has a genetic basis, therefore children of parents with specific fears and phobias are more likely to develop fear through genetic predisposition (Unnewehr, Schneider, Florin & Margraf, 1998).
125. It has been suggested that fear of some animals is innate in humans. For example, because all spiders are predators and most subdue their prey with poison, fear has been described as an evolutionary adaptation. However, Gerdes, Uhl & Alpers' (2009) results demonstrate that potential harmfulness alone cannot explain why spiders are feared so frequently. Similarly, another study reported that fears of animals correlated with expressed dislike of several species including those perceived to be non-threatening (Bowd, 1984).
126. Finding an animal disgusting or dirty has an impact on how likely children are to be fearful of that animal. Presenting children with disgust-related and cleanliness-related information about unknown animals not only induces higher levels of disgust, but also increases children's fear beliefs in relation to these animals (Muris, Mayer, Huijding & Konings, 2008). Giving negative information on imaginary animal-looking creatures to children also appears to magnify their fear. For example, telling children stories about imaginary scary dog-looking creatures, because of simple association, enhances their fear of real dogs and other predators (Muris, Bodden, Merckelbach, Ollendick & King, 2003).

Existing measures of empathy and attachment

127. A wide range of measures of empathy and attachment have been used in research on children and animals. Table II C. 1 provides a list of some of the measures most commonly used.
128. Some existing questionnaires, such as the Companion Animal Bonding Scale (Poresky, Hendrix, Mosier & Samuelson, 1987), include a series of questions on taking care of the animal. Therefore, older children and females tend to have higher scores because they report being more involved in caretaking than younger children and males (Lookabaugh-Triebebacher, 1999; Melson, Peet & Sparks, 1991). Females also tend to score higher on surveys that involve greater degrees of moral reasoning, supporting psychological research that suggests women's moral judgments are linked to empathy and compassion to a greater extent than men's (DeRosa, 1984).
129. Another important factor in the design of a questionnaire measuring empathy and/or attachment is the type of animal it targets. Zasloff (1996) used the Comfort from Companion Animal Scale to measure attachment to animals and found that dog owners showed a significantly higher degree of attachment when two items pertaining to dogs were included in the questionnaire.

Factors affecting empathy and attachment towards animals

Children's direct experience of animals

130. Children who own more than one type of pet have been found to be more empathic toward humans than those who own only one (Daly & Morton, 2006). However, while greater exposure to different types of animals is related to being more empathic towards humans, there is no research on whether this also results in higher empathy towards animals.
131. Children who have pets at home know more about how adult animals care for their young. Children with a stronger emotional tie to their pet have more ideas about what their pet is like and how pets may be cared for. They are building an 'internal working model' of this relationship and their role within it (Melson, 1990).
132. Hergovich, Monshi, Semmler & Zieglmayer (2002) reported that 6-year-old children showed an increase in animal-directed empathy as a result of having a dog present in their classroom. However, the most important factor affecting the degree of empathy felt towards the animal seems to be how much a person bonds with the animal. The degree to which a person is attached to a pet has a greater impact on empathy than simply the fact of owning a pet or living in the presence of a pet (Daly & Morton, 2003). Therefore, a person who is highly attached to an animal, even if they don't live with it, will be more empathetic toward animals in general than someone who lives with a pet but who is not emotionally attached to it.

The influence of age (developmental trends)

133. Only Poresky's study (1990) investigated children's empathy towards animals, and he did not report on the influence of age. Most children believe that their pets have feelings and most talk to their pets. However, children in preschool through to about 9-years-old report that they are not sure if their pets understand them. Older children think that their pets convey understanding of human verbalisations through physical actions such as wagging/swishing their tails, looking at the child and "smiling", holding their ears up and licking the child (Lookabaugh-Triebebacher, 1998).

Table II C. 1: Existing measures of empathy/attachment towards pets and animals

Scale	What the scale measures	Author	Age group assessed	Key findings/conclusions
Young Children's Empathy Measure (towards animals)	Children's empathy towards animals	Poresky (1990)	Preschool children	This is a brief measure of young children's cognitive and affective perspective-taking, developed to assess preschool children's empathy. Poresky (1990) used this method to measure preschool children's empathy towards pets, by adapting the questions so that these would include pets as references rather than humans
Index of Empathy for Children and Adolescents (human-directed)	Children's general empathy (towards humans)	Bryant (1982)	Children and adolescents (6, 9, and 12-year-olds)	The scale is composed of 22 items (including 2 animal-related items). This index has been used in studies investigating empathy between child pet owners and non pet owners (e.g., Daly & Morton, 2003) because it is a reliable measure of children's general empathy
Child Empathy Scale (human-directed)	Children's empathy towards humans	Vidovic, Stetic & Bratko (1999)	Primary school children (9, 11 and 13-year-olds)	No details on the structure of the scale in the paper
Animal Empathy Scale	Adults' empathy towards animals	Paul (2000)	Adults	Revised version of Mehrabian and Epstein's (1972) Measure of Emotional Empathy where all references to humans were replaced with references to familiar animals (e.g., pets and birds). In addition, further original items were developed, resulting in a total of 22 items. Eleven items represent non-empathic sentiments and 11 represent empathic sentiments
Interpersonal Reactivity Index (human-directed)	Adults' empathy towards humans	Davis (1983)	Adults	The scale is composed of 28 items. It assesses four factors/subscales: Perspective Taking; Fantasy; Empathic Concern, and Personal Distress. Internal reliability between 0.71 and 0.77

Scale	What the scale measures	Author	Age group assessed	Key findings/conclusions
The Companion Animals Bonding Scale	Attachment of humans to their companion animals	Poresky, Hendrix, Mosier & Samuelson (1987)	Children and adults (14 to 47-years-old)	CABS is an eight-item behavioural scale describing the extent of human-animal activities and attachment between humans and their companion animals
The Lexington Attachment to Pets Scale	Attachment to pets	Johnson, Garrity & Stallones (1992)	Children and adults	23-item questionnaire which includes items assessing the quality of one's relationship with a pet
Pet Attachment Survey	Children's attachment to pets	Stevens (1990)	8 th graders (13-year-olds)	This scale is composed of 29 items and assesses human-animal attachment levels for conventional pets
The Pet Attachment Scale	Children's attachment to pets	Melson, Peet & Sparks (1991)	Preschool and primary school children (4, 7, and 10-year-olds)	This was developed to represent a multi-dimensional construct of children's attachment to their pets. Includes behavioural, affective and cognitive attachment (to animals) and empathy (towards humans). Behavioural attachment estimates how often a child was judged to engage in pet-related activities. Affective attachment is assessed through parent questions regarding how often the child showed various expression of interest in and feelings towards the pet, and by administering the Pet Attachment Scale (adapted from Poresky et al., 1987) to the children. Cognitive attachment is measured by asking open ended questions on feelings about own pets and knowledge of characteristics and care of dogs and cats in general

134. In adults, pet ownership is related to higher empathy towards animals but not to higher empathy towards humans. Paul (2000) reports that past and present pet owning is associated with higher levels of animal-oriented empathy. Both Paul (2000) and Daly and Morton (2003) report no difference in human-directed empathy between pet owners and non-owners.
135. There seems to be an influence of age on empathy towards humans, which may perhaps be generalised to empathy towards animals, although more studies are clearly required in this field. Vidovic, Stetic & Bratko (1999) report that younger children (9 to 11-year-olds) are more empathic to humans than 13-year-olds. Bryant (1982), on the other hand, reported higher empathy scores among seventh grade children (12-years-old) than first (6-years-old) and fourth graders (9-years-old). These results suggest that perhaps empathy to humans is highest around 12 years of age and is lower before and after it peaks at that age. However, the differences in these studies may be due to the fact that they used different methods to measure empathy.
136. Findings in relation to age at which attachment to pets is greatest are mixed. Melson, Peet & Sparks (1991) found attachment to pets to be strongest among 9 to 10-year-olds. By contrast, Vidovic, Stetic & Bratko (1999) report that attachment to pets gradually decreases with age.
137. Pets appear to bring comfort to children. Davis and Juhaz (1995) suggest that preadolescents perceive the family pet as providing them with empathic and complementary friendship. McNicholas and Collis (2001) also report children aged 7 to 8-years-old often ranking pets higher than other human relationships. Pets featured prominently as providers of comfort, esteem support and confidantes for a secret.

Gender differences

138. Gender differences in empathy are evident in some studies but not in others. Studies that involve observation of subjects handling pets find few or no significant gender differences in interactions with animals (Daly & Morton, 2003). By contrast, surveys data suggests that females tend to be more empathic towards animals and humans than males in adults (Paul, 2000) and children (Vidovic, Stetic & Bratko, 1999). Daly and Morton (2006) found 8 to 14-year-old girls were significantly more empathic than boys.
139. In terms of attachment to pets, again results concerning gender differences are complex and mixed. Males exhibit just as many attachment-promoting behaviours (e.g., physical contact with pet) as females. Similarly, studies using interviews show no significant gender differences in reported physical affection given to or by a pet (Kidd & Kidd, 1985). Within self-report surveys, males tend to express significantly less attachment to pets than females (Holcomb, Williams & Richards 1985; Kellert, 1980; Kellert & Westervelt, 1983; Kidd & Kidd, 1985). An exception to this rule is evident in Ganster and Voith's (1983) study of adult cat owners. The only gender difference related to females being more likely to talk to cats "a lot". Some authors suggest that the situation or descriptions of affective states are closer to how females describe such experience; therefore, females inevitably score higher in attachment than males (Stevens, 1990).

Ethnic and cultural influences (society/media)

140. The role of pets in the family has been described as a 'culturally bound phenomenon' (Siegel, 1995) and the way in which children perceive and describe pet care is likely to be influenced by cultural expectations that encourage certain kinds of behaviour (see Section II B). For example, girls are expected to be nurturing and may respond accordingly in their relationships with their pets. According to Morrow (1998), 'the

emotional importance of companion animals merits further study, because it clearly expresses cultural norms in relation to the management of emotions' (p. 224).

141. However, in a study investigating children's perceptions of morality in relation to particular behaviours, both Indian and American 5 to 7-year-old children reported that 'kicking a harmless animal' was wrong (Shweder, Mahapatra & Miller, 1987). This was one of only a few statements that children considered to be wrong. Howe, Kahn & Friedman (1996) also found no cultural difference in morality towards animals in children from the United States and Brazil in both urban and forest village children.

The influence of geography (urban/rural residence)

142. No literature specifically focusing on differences in empathy between children from urban and rural areas was found. However, as seen in Part II B, some differences in attitudes toward animals exist between children in urban and rural areas, and since empathy and attitudes seem to be closely related, differences in empathy may also exist.
143. As mentioned above, a study comparing children in urban and rural parts of the Brazilian Amazon was carried out by interviewing children on how they understand and value their relationship with the natural environment (Howe, Kahn & Friedman, 1996). This study showed no cultural differences in morality towards animals between children in urban and rural environments.

Summary & implications for interventions to promote a DOC

144. *Empathy towards animals can be learned and developed through experience. Interventions that enhance a child's empathy towards animals will have an impact on children's ability to care for them and potentially on the longer-term development of positive attitudes and behaviour towards animals in general.*
145. *Promoting attachment to animals should also be an aim of interventions aimed at improving DOC towards animals among children because understanding how the animal feels is necessary in order to respond to its needs.*
146. *Both empathy and attachment appear to be strongest in 9 to 10-year-old children, suggesting that they would be most sensitive to educational interventions at this age.*
147. *While there is no conclusive evidence that gender, culture or geography have an influence on empathy, girls often appear to be more empathic in self-report surveys. This needs to be taken into account within interventions; a possible reluctance among males to demonstrate this kind of behaviour or attitude.*
148. *The literature shows that promoting animal-directed empathy is possible and relatively easy to do with children. For example, simply having a pet present in the classroom can increase animal-directed empathy.*

PART III: INITIAL RESEARCH WITH CHILDREN

Introduction

149. Part III is organised in two sections and the data presented are from our fieldwork undertaken with children and young people during the first year of the project.
150. Section A describes the focus group work undertaken with pupils from 7 to 13 years of age and presents the findings in terms of the emergence of key themes.
151. Section B describes the background to the survey and the way it was developed and administered, and presents preliminary findings. The findings are structured to shed light on the following areas:
 - The extent of pet ownership
 - Age differences in attitudes, attachment and empathy
 - Gender differences in attitudes, attachment and empathy
 - Relationships between attitudes, attachment and empathy
 - The impact of pet ownership

III A: Focus groups with children

Aims and objectives of the focus groups

152. The literature search revealed a paucity of research on children's knowledge, attitudes and feelings about caring for animals. In addition, there is also little UK research on children and young people's perspectives on animals. As Morrow (1998) points out, *'the way in which animals impinge upon children's lives is rarely discussed in British sociological accounts of childhood or the psychological literature on child development'* (Morrow, 1998). Exceptions are Paul (1992) and Paul and Serpell (1992) but these examine the issue retrospectively, and work on the cognitive development of biology knowledge (e.g., Williams & Smith, 2006). There are, according to Morrow, few accounts of 'ordinary' children; the focus has been on those with additional support needs.
153. Our primary aim was to carry out some preliminary research to shed light on the ways in which children talk about animals and their connections with them in order to develop our interventions work by complementing our knowledge from the literature.
154. Specific objectives were to:
 - identify children's attitudes towards animals (their reasoning for preferring or disliking certain animals),
 - investigate children's understanding of animal care (their perceptions of animals' needs as well as their role [and others'] in caring for pets), and
 - examine the role of age and gender in shaping attitudes and determining roles in relation to pet caring activities. We will be examining the influence of geography (urban/rural settings) in Year 2.

Methodology and sample

155. Focus groups were the chosen method as they are ideal for examining attitudes; they can resemble ordinary conversations when group members know each other. The groups were semi-structured, in that they were designed to promote conversation around our core themes of interest, yet also allow children to deviate from our questions. This allows greater insight into children's perspectives as the groups are not permanently researcher-led.
156. The planned sample was to include children aged 7, 9, 11 and 13 to (a) match the age ranges in the survey, but also to (b) extend the sample to the younger age group. We aimed to run two groups within each age range. Therefore, the planned sample included eight focus groups. The plan was for each group to comprise four same-sex pupils (32 pupils in total). The achieved sample is presented in Table III A. 1. 14 groups were undertaken with 53 pupils in total.

Table III A. 1: The focus group sample

Year group	School 1 (Primary)		School 2 (Primary)		School 3 (Secondary)		Total
	Girls	Boys	Girls	Boys	Girls	Boys	
P3 – Age 7	6	4	4	4	-	-	18
P5 – Age 9	4	4	-	4	-	-	12
P7 – Age 11	4	-	4		-	-	8
S2 – Age 13					8	7	15
Total	14	8	8	8	8	7	53

157. The focus groups were structured around a series of activity sheets, photos of pet animals and discussion questions. The full protocol is provided in Appendix 5. The sequence of the discussion was as follows:

- Favourite/worst animals (Activity Sheet), with exploration of attitudes towards farm animals
- Knowledge of animal needs (Using photos of a cat, a dog, a fish and a hamster as prompts)
- Pet ownership and responsibility for pet care in the home (Activity Sheet)
- Factors inhibiting a DOC

Preliminary findings from the focus groups

158. Following a preliminary coding of the transcripts from the primary pupil groups, this section highlights a number of themes that are likely to be important when considering how to promote a DOC in children and young people. These are only briefly discussed here, but will be expanded, following a second stage of fieldwork with an urban sample.

Favourite animals

159. The animals that emerged as the top three favourites for boys and girls were dogs, cats and rabbits. Girls then chose horses, dolphins/elephants and boys, tigers and hamsters. The reasons underlying children's animal preferences could be categorised in the following ways:

- *The animal's appearance* (cute, beautiful, soft, fluffy, cuddly, nice colours)
- *The animal's behaviour* (reference most often made to dogs being playful, friendly and understanding the child. Children felt their dogs 'hugged' them and showed sympathy if they were hurt and they liked the way dogs jumped up to them, gave them handshakes and licked them)
- *Familiarity with the animal/friendship* (children often saying the animal was their favourite because they had one. Again, those with dogs described them as friends or part of the family and believed they had a relationship with them that was not possible with other animals)
- *Self-animal comparisons* (e.g., one girl liked giraffes because she was tall)
- *Experience with non-pets* (e.g., swimming with a dolphin, holding a snake)
- *Intrigue* (more exotic animals from other countries are interesting because you don't see them often, only in zoos)

Worst animals

160. The top five worst animals for girls were spiders, snakes, insects, sharks and slugs/snails and jellyfish, sharks, pigs, crocodiles and horses for boys. Children initially found it more difficult to think of animals they didn't like than those they did. As they explained, you tend to think more about animals you like: 'like all the cute ones, those you want to have' (Samantha, P7). The reasons underlying their choice of least favourite animal could be categorised in the following ways:

- *Negative appearance or characteristics* (smelly, hairy, slithery)
- *Behaviour (actual or imagined)* (vicious, scary, creeping up on you)
- *Negative experience with an animal* (usually negative physical contact, either being hurt, irritated or not enjoying holding one)
- *Potential harm* (animals they thought would kill you or eat you – Piranhas, poisonous tree frog, scorpions, sharks or those that harm by stinging or strangling. Boys tended to be more extreme than girls)

Farm animals

161. Interestingly, children who lived on farms identified a farm animal in their list of favourites. They explained this in terms of their familiarity with the animal and often described it as theirs. Other children were asked why farm animals did not appear in their lists and there were mixed views. Initially, it appeared that they didn't immediately think of farm animals, but often children said they did like lambs, sheep, chickens, cows, or pigs but they just were not favourites. However, more negative views were expressed (particularly by boys). In these instances, farm animals were described as boring (often because you see loads of them in a field or 'doing nothing' – compared with a Collie who 'has a proper job'). Pigs and cows were described as smelly and concerns were expressed about potential harm from rams and cows.

Knowledge of animal needs

162. Children were asked initially if they knew what the dog, cat, hamster and fish (in the photos we presented) needed to eat and responses tended to be 'dog food', 'cat food', etc. They were often uncertain about the ingredients and the frequency with which they should be fed, but they were also aware that their animal ate certain foods that they perhaps shouldn't (as a result of family members giving them leftovers from their plates or 'treats'). Children often made reference to their animal being too fat, as they (themselves and their family) fed them too much or too often. It appears that provision of accurate information about animal needs is required, but may not be sufficient on its own to guarantee knowledge translates into practice. Implicitly formed attitudes developed through observation of family in particular are likely to be a stronger influence (see Part II B).
163. Children were then asked to reflect on what else each of the four animals needs to stay healthy/well. Girls tended to invoke 'love' as an important need more than boys and several P3 and P5 groups referred to the need for a 'good owner'. When asked what they meant by a 'good owner', the general perception was that they needed someone who not only made sure they were fed and housed properly but also gave them attention and worried about them (i.e., not someone who *'just puts some food out and then goes to work and then just puts other food out and doesn't really care'* (P5 girl)). Dogs were generally viewed as needing more than other animals (in terms of company, interaction, love and exercise). Greater affection was expressed about the dog and cat in comparison with the hamster and fish and there was a great deal of confusion around caring for fish, mainly as a result of having owned fish that subsequently died. Confusion centred around the amount of food they should be given, a concern about them eating rocks and moss, water type and temperature and the functioning of filters.
164. Children who were clearly the main carer for their pet animal appeared to have more comprehensive understanding of the animal's needs and how to respond to those needs (often taking responsibility for finding out more). Other children reported that they were not allowed to care for their animals in certain ways, as parents thought they would not treat the animal 'properly'. This may have implications in terms of taking responsibility and feeling skilled enough to care for animals.

Responsibility

165. There was wide variation between the children in terms of how much they looked after family pets. Some children reported doing 'everything' while others described how they just played with them. Those who reported doing everything expressed this with some negativity and it appeared to have been a rule imposed by parents as it was the child's pet or was due to other family members not being interested in the animal. A couple of children even felt if they didn't care for their animal, no one else would and they would die. Where children played a significant role in caring for their pet, they often displayed more detailed and accurate knowledge; a few stating that they had more knowledge than their parents.

166. Interestingly, when considering who *should* look after family pets, most children felt the person who owned it should be mainly responsible, but that everyone in the household should contribute. They recognised that one person could not always be there to take care of the animal and that other members of the family should step in. Some children felt everyone should do something small towards looking after them; sharing the responsibility, particularly if they wanted to play with the pet (i.e., doing something for the pet in return). However, there was also recognition that in spite of these beliefs, they perhaps behaved differently. While most described playing with their pet (and this being important for the animal), some children recognised that they did not do that much.
167. There was recognition among some pupils that they may not have cared for animals properly when they were younger and that perhaps small children, as Siobhan (P7) put it, *'try to play with them for the children's fun, not for the dog's fun. They think it's a toy'*. There was also a perception that it is often children who ask for the pet animal, so they should take responsibility for it; with increasing responsibility as the child gets older and more capable. One girl felt younger children actually bonded with animals more than older people on the basis of something she had read, but most felt that young children need to be trained how to look after an animal.

Specific care-taking tasks

168. Children were asked how they personally cared for the family pet and most immediately referred to playing with it. Other tasks mentioned were: filling up food and water; walking the dog (with others); cleaning out (although usually a task undertaken by mums); brushing; protecting (from other animals or brothers); breaking the ice on horses' water, buying food and petting. One P3 girl mentioned making sure her animal was not upset, while another said she let the dog in bed with her. Two of the pupils who had horses displayed far more knowledge of the details of looking after them and clearly played a significant role in these activities.
169. Children admitted making up excuses not to clean out animals or leaving it for mum if things were too messy. Some children also mentioned not being allowed to do certain tasks, as parents feared they would not care for them properly. The gendered nature of caring activities carried out in the home was evident in the children's discussions, with the men of the family being more involved in buying food and walking the dog and the women more involved in everyday activities and particularly cleaning out. This often appeared to be viewed as a household chore in line with Morrow's (1998) findings.

Factors inhibiting a DOC

170. Children raised a number of issues throughout the focus groups that highlight reasons why they may not always care properly for pet animals (or do certain tasks) or why they require help in looking after them. These are listed below:
- Disliking cleaning out/mucking out animals (Children admitted making up excuses to get out of this task)
 - Not being attached to/interested in the family pet
 - Having allergies
 - Parents' 'uncaring' behaviours or attitudes
 - Behaviour of animals (e.g., dogs not interacting well with other dogs is an impediment to the child walking them alone, having a 'wild' horse, children's perception that the animal doesn't like them)
 - Not being able to access the animal (shed) or things the animal needs
 - Parental rules (not being able to walk the dog alone or brush it in case the child caused harm)
 - Being fearful of the pet; uncertain about its behaviour
 - Being disgusted by the pet food

- Having lots of homework
 - Parents refusing to help out the child to look after their pet
171. Interestingly, when asked if there was anything they would like to do to look after their animal that they can't do at the moment, children often came up with what we have termed, 'a wish list'. These included:
- Being able to talk to the animal using the same language
 - Being able to take animals for a walk (rabbit, hamster, fish etc.)
 - Being able to carry out tasks that only a vet can do (trim nails)
 - Being able to play with an animal not capable of doing so (fish)
 - Wanting to take them outside without the risk that they might get lost
 - Wanting to have pets upstairs/in bedroom when not allowed
 - Some children without pets wished they could have one but could not persuade their parents
 - Having more interaction with pets that are not that interactive (hamsters being nocturnal)
172. Some sympathy was expressed about their animal's feelings. Examples included dogs whining at the bottom of the stairs (interpreted as wanting to go up with the child) and fish only having limited space. This latter concern often invoked a response from others that fish only have a short memory so space doesn't matter. An interesting finding also relates to children's responses to the question 'do you think animals have feelings'. There was some variation here based on the species in question; suggesting that belief in animal mind (and therefore subsequent attitudes, respect and care) is not universal. This topic stimulated interest and may therefore be a useful way of addressing animal needs, care and responsibility.

Knowledge about animal care

173. Children were asked how they knew how to care for animals and/or how they might find out. The following list summarises their responses:
- Family (education or observation)
 - Leaflets from the shop where the animal was purchased
 - Training from the dog's home
 - Research on the internet
 - Could ask the pet shop or the vet
 - TV programmes – Animal Planet
 - Intuition and through experience with the animal (P3 girls)
 - People they know who have pets

Other emerging themes

174. A number of themes could be discerned from the children's conversations that were not specifically addressed by our questions. The key themes are listed below and will be discussed in more detail when all of the data is analysed.
- **Apparent cruelty** (their own and observations)
Interestingly, it was within the older age group that issues relating to the ways humans mistreat animals were raised. From 11 upwards, there was less focus on aesthetics and animal needs and a shift towards animal welfare in the broader sense. They demonstrated greater awareness of (and interest in) animal welfare campaigns on TV, people who 'train' dogs to bite/fight or smuggle drugs and TV programmes that focus on the policing of animal cruelty.
 - **Gendered associations**
Gender clearly plays a role in terms of caring activities within the home. Caring for babies/young children becomes associated with 'women's work' as early

as 3 years of age (Melson, 1990) and although children themselves did not appear to apply gender roles to specific activities, it was clear that observation of family members was an influence. Often because mum is at home and dad is out at work, household duties are undertaken by mum and caring for pets appears to form part of this role.

- **'Reading' animals (or misreading)**

It was clear that children wanted to understand their animals better and did not always interpret their pet's behaviour accurately. Their eagerness and confusion signal a focus for intervention work with the 7 to 13 age group.

- **Self-animal comparisons**

In line with findings in Part II A, children often referred to situations they had personally experienced when thinking about what happens to animals (i.e., they were developing beliefs about animals and animal needs based on what happens to humans and human needs).

Summary & implications for interventions to promote a DOC

175. *Preliminary findings from the focus groups are limited to data from pupils from rural schools (N=53).*
176. *Even with direct experience, children's relationships with animals and their understanding of animal needs can vary as a function of a range of factors including gender and their personal relationships with their pets.*
177. *The family context appears particularly important in relation to the gendered nature of caring activities within the home, as well as the impact of parental views and reactions on children's behaviour.*
178. *Children often appear to misinterpret their animal's behaviour and are uncertain about the details of animal care, even in relation to the animals they own. This suggests a role for interventions in providing education on specific animal needs and how to interpret typical animal behaviour.*
179. *Children's views on whether animals have feelings was species-dependent, suggesting belief in animal mind is not universal. This topic stimulated interest and might therefore be a useful means of addressing animal needs, care and responsibility.*
180. *Children who show a stronger attachment to their pet and are allowed (by parents) to take responsibility for its care, appear to possess more detailed and accurate knowledge about the animal's needs.*
181. *A shift in interest in animals was evident with the 11 and 13-year-olds towards a concern with animal welfare in its broader sense (issues connected to cruelty and exploitation), suggesting a focus for interventions with older children.*
182. *Any interventions to enhance DOC among children need to take into account the factors that act as barriers to children caring for animals.*
183. *Further systematic research is required to examine in more depth children's relationships with animals, their attitudes towards animals and their cognitive understanding of animals needs.*

III B: The pupil survey

'Children and young people's views of animals and pets'

Background, aims and objectives

184. It is clear from the literature that there are very few studies of children's attitudes towards and relationships with animals in the UK. In the past, studies have shown British children to be more positive than their American counterparts (Paterson, 1989). Pet ownership is also more prevalent in the UK than many other countries and has been linked with more positive attitudes. There is, therefore, a need for up-to-date UK-based data from children.
185. Our aims are to assess the relationships between attitudes, attachment and empathy in a sample of UK children and identify measures that could be used to ascertain the impact of interventions.
186. Specific objectives are to:
 - assess age and gender differences in attitudes, attachment and empathy (the influence of area of residence (urban/rural) will be investigated in Year 2);
 - ascertain the relationships between attitudes, attachment and empathy;
 - compare attitudes, attachment and empathy of children with and without pets;
 - identify the face validity of individual questions for the age groups of interest;

Survey development and administration

187. Three age groups were targeted for the survey; 9, 11 and 13-year-olds (P5, P7 and S2 in the Scottish education system). As Section II A explained, children between 7 and 12 years may be particularly open to learning about animal needs and DOC; however, survey development for the younger age range is problematic. Accordingly, 7-year-olds were included only within the focus groups discussed in the previous section.
188. Existing measures were assessed for their suitability with the age range of interest and in terms of the underlying constructs they were measuring. We deliberately chose a number of sub-scales with items that overlapped in relation to attachment and included questions that tapped into both positive and negative aspects of the relationship. Four existing scales/sub-scales were chosen for inclusion and each used a 5-point Likert scale (strongly agree to strongly disagree).
189. The survey was administered by a member of the research team to whole classes of children and young people during one lesson period. They took between 15 and 40 minutes to complete and participants were encouraged to ask the researcher if they had any questions about the survey items or the project in general. Specific survey queries were recorded and the children were given a bookmark to thank them for taking part. Schools were promised a summary of the findings in due course for both teachers and the children.

Measures

190. *Background:* Questions were included to identify age, gender, date of birth and socioeconomic status (using the Family Affluence Scale developed by Currie, Molcho, Boyce, Holstein, Torsheim & Richter, 2008).
191. *Pet ownership:* Five questions were developed specifically for this study to ascertain current and past ownership of pets, the type of pet currently and previously owned, the number of pets in the household and whether there was a pet that the child considered their own.

192. *Attitudes towards pets:* Two sub-scales of the Pet Attitude Scale (PAS-Modified) (Templer, Salter, Dickery, Baldwin & Veleber, 1981; Munsell, Canfield, Templer, Tangan & Arikawa, 2004) were included, identified by Templer et al. as assessing 'love and interaction' (4 items) and 'joy of pet ownership' (3 items). One single-item negatively worded question 'I hate animals' was also included. The 5-point Likert scale was employed, as used by Daly and Morton (2006), rather than the original 7-point scale. Minor amendments to wording were made to one of the questions. A further question was developed for this study, which asked children if they had a favourite animal and if so, to specify the type. Children had three options, 'yes', 'no – I like all/most animals' or 'no – I don't like animals'.
193. *Attachment to pets:* The 12-item Attachment to Pets Scale developed by Staats, Miller, Carnot, Rada & Turnes (1996) was included. Five items were drawn from the Kafer, Lago, Wamboldt & Harrington (1992) Pet Relationship Scale, which measures three major components of relationships to pets: (1) affectionate companionship, (2) equal family member status and (3) mutual physical activity. Staats et al. added four items on affectionate companionship and three items on pet ownership problems. The general attachment sub-scale of the Lexington Attachment to Pets Scale (Johnson, Garrity & Stallones, 1992) was also used. This sub-scale is comprised of 10 positively oriented items and 1 negative. Importantly, children were instructed only to answer these questions if they had a pet.
194. *Empathy:* The Affective Empathy sub-scale of the Empathy Questionnaire (Enz, Zoll & Watson, in prep) was included to assess whether pet ownership is associated with human-directed and animal-directed empathy. This is a 10 item-scale, with one item assessing the latter: 'I get upset when I see an animal being hurt'. 6 items were drawn from Bryant's Index of Empathy Measurement for Children and Adolescents (1982), which is a child and adolescent version of Mehrabian and Epstein's (1972) adult measure of emotional empathy. The remaining 4 items were developed by Enz et al. (in prep).

The sample

195. The fieldwork was carried out with the rural sample identified in the previous chapter. We will replicate this study within an urban sample during Year 2. As far as possible, schools will be matched in terms of area deprivation (socio-economic status).
196. The planned sample comprised approximately 30 pupils within each age/year group within one secondary school and two associated feeder primary schools, making a total per area of 90 pupils. Table III B. 1 shows the achieved sample within the rural area. In total, 62 girls and 59 boys completed a survey. As the table shows, the sample was not evenly distributed across the schools or year groups; 67% of the sample came from School 2 and 47% were P5 pupils. We will be able to adjust for this in future analyses.

Table III B. 1: The survey sample

Year group	School 1 (Primary)		School 2 (Primary)		School 3 (Secondary)		Total
	Girls	Boys	Girls	Boys	Girls	Boys	
P5 – Age 9	7	5	22	23	-	-	57
P7 – Age 11	7	5	14	12	-	-	38
S2 – Age 13	-	-	-	-	12	14	26
Total	14	10	36	35	12	14	121

Preliminary findings from the pupil survey

Scale reliabilities

197. All the existing measures proved to be reliable using Cronbach's alpha to assess how well the individual items fit together to produce a scale that measures the predefined underlying construct. A Cronbach's alpha of .7 is deemed sufficient to demonstrate the strong underlying structure. The 8-item Pet Attitude Scale had a Cronbach's alpha of .76 (N=119); the 12-item Pet Attachment Scale .80 (N=97); the 11-item Lexington Attachment to Pets Scale .90 (N=98), and the 10-item Affective Empathy Scale .86 (N=118). Analysis of the contribution each item made to the scale as a whole suggests that two items on the Pet Attachment Scale might not fit with the remaining 10 items. This will be ascertained when we run the analysis on a larger dataset in Year 2. There was also a ceiling effect on one of the PAS-M questions ('I hate animals').

Pet ownership

198. Table III B. 2 shows the distribution of pet ownership in the sample so far by age and gender. Overall, 79% of the pupils surveyed reported that they currently had a pet in their home. When past ownership of pets is included, this figure rises to 84% (girls=82%, boys=86%). There were no age differences in current pet ownership or gender differences, although this may alter with a larger sample.

Table III B. 2: The extent of current pet ownership in the rural sample

Year group		Girls		Boys		Total	
		N	%	N	%	N	%
P5 – Age 9	Pet owner	22	75.9	22	78.6	44	77.2
	Not pet owner	7	24.1	6	21.4	13	22.8
P7 – Age 11	Pet owner	18	85.7	13	76.5	31	81.6
	Not pet owner	3	14.3	4	23.5	7	18.4
S2 – Age 13	Pet owner	10	83.3	11	78.6	21	80.8
	Not pet owner	2	16.7	3	21.4	5	19.2
Total	Pet owner	50	80.6	46	78.0	96	79.3
	Not pet owner	12	19.4	13	22.0	25	20.7

199. Table III B. 3 shows the proportions of children (by age and gender) who feel they have a pet of their own and those who do not. Overall, 56% of the pupils surveyed reported that they had a pet of their own. Importantly, this shows that not all children who have a pet in the family home feel they belong to them personally.

Table III B. 3: The extent of personal pet ownership in the rural sample

Year group		Girls		Boys		Total	
		N	%	N	%	N	%
P5 – Age 9	Pet of own	15	51.7	18	66.7	33	58.9
	No pet of own	14	48.3	9	33.3	23	41.1
P7 – Age 11	Pet of own	11	55.0	7	41.2	18	48.6
	No pet of own	9	45.0	10	58.8	19	51.4
S2 – Age 13	Pet of own	7	58.3	8	66.7	15	62.5
	No pet of own	5	41.7	4	33.3	9	37.5
Total	Pet of own	33	54.1	33	58.9	66	56.4
	No pet of own	28	45.9	23	41.1	51	43.6

200. 35% of those who have a pet at home do not feel they have a pet of their own, while 22% of children who do not have a pet in the family home, report that there is a pet they feel is their own (data not shown in tables). Within the focus groups, children's

explanations suggest that this is due to their parents living apart (i.e., dog lives with dad) or a strong connection with a pet who belongs to another family member, neighbour or friend.

Age differences in attitudes, attachment and empathy

201. Table III B. 4 presents data relating to age differences on the four existing scales used in the study. They show that although 9-year-olds tend to score slightly higher on all measures than 11 and 13-year-olds, these did not approach statistical significance. This may alter with the larger sample.

Table III B. 4: Age differences on the Pet Attitude Scale

Year group	N	Mean score	Std. deviation	Age difference (Sig.)
Pet Attitude Scale				
P5 – Age 9	57	4.38	.45	.548#
P7 – Age 11	38	4.25	.67	
S2 – Age 13	26	4.28	.58	
Total	121	4.32	.55	
Pet Attachment Scale				
P5 – Age 9	49	4.14	.07	.762#
P7 – Age 11	32	4.07	.69	
S2 – Age 13	21	4.03	.67	
Total	102	4.09	.59	
Lexington Attachment Scale				
P5 – Age 9	49	4.34	.55	.291#
P7 – Age 11	32	4.16	.83	
S2 – Age 13	21	4.09	.70	
Total	102	4.23	.68	
Affective Empathy Scale				
P5 – Age 9	57	3.94	.65	.109#
P7 – Age 11	38	3.65	.76	
S2 – Age 13	25	3.66	.92	
Total	120	3.79	.75	

* Significant at $p \leq 0.05$ # not significant

202. Interestingly, in response to the specific item relating to animals on the empathy scale: 'I get upset when I see an animal being hurt', the percentage of children choosing 'strongly agree' decreased over the three year groups (P5=88%, P7=71%, S2=56%), though this may alter when we have the larger sample with equal size age/year groups. It should also be noted that the shift was towards answering 'agree' and not the more negative responses 'not sure', 'disagree' or 'strongly disagree'.

Gender differences in attitudes, attachment and empathy

203. Table III B. 5 presents data relating to gender differences on the four measures employed. While there were no differences in attitudes towards pets or attachment (for those who owned pets), girls scored significantly higher on the Affective Empathy Scale.

Table III B. 5: Gender differences on the attitude, attachment and empathy measures

Scale	N	Mean score	Std. deviation	Gender difference (Sig.)
Pet Attitude Scale				
Girls	62	4.39	.53	.143#
Boys	59	4.24	.57	
Pet Attachment Scale				
Girls	51	4.18	.51	.136#
Boys	51	4.01	.65	

Scale	N	Mean score	Std. deviation	Gender difference (Sig.)
Lexington Attachment Scale				
Girls	51	4.33	.57	.146#
Boys	51	4.13	.77	
Affective Empathy Scale				
Girls	62	4.03	.63	.000*
Boys	58	3.53	.79	

* Significant at $p \leq 0.05$ # not significant

204. In response to the specific item relating to animals, girls were significantly more likely than boys to choose 'strongly agree' (84% compared with 67% of boys), although only 7 pupils in total chose 'not sure', 'disagree' or 'strongly disagree'.

Relationships between attitudes, attachment and empathy

205. Table III B. 6 shows the correlations between the four different measures employed for the whole sample. As expected, there are strong relationships between the Pet Attitude Scale and both attachment measures and between both attachment scales. Correlations between attitudes/attachment and empathy, although significant, are fairly low and this appears to be the result of a relationship between them for boys and not girls (see Table III B. 7).

Table III B. 6: Pearson Correlations between the four attitude, attachment and empathy measures

Scale	Pet Attitude Scale	Pet Attachment Scale	Lexington Attachment Scale	Affective Empathy Scale
Pet Attitude Scale				
Pearson Correlation	1	.745**	.764**	.286**
N	121	102	102	120
Pet Attachment Scale				
Pearson Correlation	.745**	1	.860**	.297**
N	102	102	102	102
Lexington Attachment Scale				
Pearson Correlation	.764**	.860**	1	.281**
N	102	102	102	102
Affective Empathy Scale				
Pearson Correlation	.286**	.297**	.281**	1
N	120	102	102	120

** Significant at $p \leq 0.01$

Table III B. 7: Comparison of Pearson Correlations among boys and girls

Scale		Pet Attitude Scale	Pet Attachment Scale	Lexington Attachment Scale	Affective Empathy Scale
Pet Attitude Scale	Boys	1	.769**	.766**	.291*
	Girls	1	.688**	.750**	.229
Pet Attachment Scale	Boys	.769**	1	.880**	.343*
	Girls	.688**	1	.818**	.125
Lexington Attachment Scale	Boys	.766**	.880**	1	.319*
	Girls	.750**	.818**	1	.118
Affective Empathy Scale	Boys	.291*	.343*	.319*	1
	Girls	.229	.125	.118	1

* Significant at $p \leq 0.05$ ** Significant at $p \leq 0.01$

206. Correlations between the single item measure of animal-directed empathy and the three other scales were fairly low, although this item needs to be interpreted with care:

Pet Attitude Scale	.395**
Pet Attachment Scale	.441**
Lexington Attachment Scale	.396**

Comparison of children with and without pets

207. Table III B. 8 shows that children who report currently having a pet at home do not differ from those who do not have a pet in terms of their attitudes or their affective empathy.

Table III B. 8: Differences between children who have a pet in their home and those who do not on the attitude and empathy measures

Scale	N	Mean score	Std. deviation	Family pet difference (Sig.)
Pet Attitude Scale				
Pet in home	96	4.35	.53	.218#
No pet in home	25	4.20	.64	
Affective Empathy Scale				
Pet in home	96	3.78	.79	.862#
No pet in home	24	3.81	.60	

* Significant at $p \leq 0.05$ # not significant

208. Table III B. 9 presents data relating to the differences between children who consider that they have a pet of their own and those who feel they do not (whether or not they report that they actually have a pet in their home). Interestingly, the difference on the attitude scale for these two groups approached significance, signalling the importance of a personal connection with a pet animal; a feeling that the pet belongs to them.

Table III B. 9: Differences between children who feel they have a pet of their own and those who do not on the attitude, attachment and empathy measures

Scale	N	Mean score	Std. deviation	Own pet difference (Sig.)
Pet Attitude Scale				
Have pet of own	66	4.43	.51	.058#
No pet of own	51	4.24	.53	
Pet Attachment Scale				
Have pet of own	64	4.15	.56	.199#
No pet of own	36	3.99	.64	
Lexington Attachment Scale				
Have pet of own	64	4.32	.69	.098#
No pet of own	36	4.08	.65	
Affective Empathy Scale				
Have pet of own	66	3.77	.83	.673#
No pet of own	51	3.83	.65	

* Significant at $p \leq 0.05$ # not significant

209. Analysis of the single item empathy measure relating to animals showed no difference between those with a pet in their home and those without and between those who have a pet they consider their own and those who do not.

Further development of the research with children

210. As part of the identification of measures that could be used to assess the impact of interventions, the research team identified an opportunity to generate a unique dataset of potential interest to Defra and that would help us develop our work further. The

Child and Adolescent Health Research Unit (CAHRU) hosts the International Coordinating Centre for the Health Behaviour in School-aged Children (HBSC) Study (described below) and is responsible for the national survey in Scotland. As the next survey (2010) is currently being developed, there is the potential to incorporate a short set of questions relating to pet ownership and attachment. Our research with children enabled the identification of a sub-set of items to incorporate into the HBSC survey in England, Scotland and Wales initially, which could perhaps be extended to other countries in the future.

The HBSC study

211. HBSC is a cross-national WHO collaborative study involving a multi-disciplinary network of researchers from 43 countries and regions in Europe and North America. The study aims to enhance understanding of adolescent health behaviours, health and lifestyles in their social context. The survey is administered every four years using a common research protocol and national teams can incorporate additional questions of interest in their country.
212. The target age groups are 11, 13 and 15 with a sample of approximately 1500 per age group in all participating countries. The international standard questionnaire enables the collection of common data across all participating countries and thus enables the quantification of patterns of key health behaviours, health indicators and contextual variables. These data allow cross-national comparisons to be made and, with successive surveys, trend data is gathered and may be examined at both the national and cross-national level. As well as being a research and monitoring study, HBSC also aims to inform and have an impact on national and international health promotion and health education policy, programmes and practice aimed at young people.
213. Each HBSC survey questionnaire contains a core set of questions looking at the following:
 - Background factors: demographics, social background (family structure, socio-economic status), maturation
 - Individual and social resources: body image, family support, peers, school environment
 - Health behaviours: physical activity, eating and dieting, smoking, alcohol use, cannabis use, sexual behaviour, violence and bullying, injuries
 - Health outcomes: symptoms, life satisfaction, self-reported health, mental health.
214. The inclusion of items on pet ownership and attachment provides a unique opportunity to generate data that sheds light on the influence of pets/animals on a range of health-related attitudes, behaviours and outcomes. In the longer term, members of the wider HBSC network may adopt the questions, thus enabling collaborative enquiry into cross-cultural differences.

Summary & implications for interventions to promote a DOC

215. *Preliminary findings from the pupil survey are limited to the data from pupils from rural schools (N=121).*
216. *All the existing scales employed in the study (measuring attitudes towards pets, attachment to pets and affective empathy) proved to be reliable with our sample, although two items on the Pet Attachment Scale need further investigation within the final dataset. We have identified and modified scales that could be used to assess the impact of interventions in Years 2 and 3.*
217. *79% of the sample reported that they currently had a pet animal in their home; 84% reporting that they had owned a pet in the past. Importantly, not all children who have a pet in the family home feel they belong to them personally and there are children who report that there is a pet that they feel is their own even when they do not live in their home. This distinction is important in terms of identifying differences between 'pet owners' and 'non-pet owners'; what exactly constitutes 'ownership'? The issue of responsibility for animals within the family context could be a useful focus in interventions.*
218. *There were no age or gender differences in attitudes towards and attachment to pets, though there are signs that 9-year-olds have more favourable attitudes and stronger attachment than the 11 and 13-year old pupils. This confirms a need stated earlier in the report to target the 'dropping off' point, when children move to secondary school.*
219. *There were no age differences in children's affective empathy. However, girls scored significantly higher than boys in line with expectations. In relation to the specific item on animals, there are signs that levels of empathy decrease with age. Girls also respond more favourably to this question than boys, suggesting that interventions need to be tailored according to gender-based interests and predispositions. Nonetheless, this item in isolation needs to be interpreted with care. Further indicators of empathy towards animals are needed.*
220. *As anticipated, there were strong correlations between the Pet Attitude Scale, The Pet Attachment Scale and the Lexington Attachment Scale. Each of these measures was also significantly correlated with the Affective Empathy Scale, although the correlations were low and only appear to be present among boys.*
221. *Children who report currently having a pet at home did not differ from those who do not in terms of their attitudes or affective empathy. However, attitudes may be more favourable among children who feel they have a pet of their own. Direct contact and an understanding of animal needs/behaviours may support the development of greater empathy.*

PART IV: INTERVENTIONS

What kinds of interventions are currently being used and how is their effectiveness evaluated?

Introduction

222. Part IV is broken down into two sections:

A: EVIDENCE ON INTERVENTIONS FROM THE PUBLISHED LITERATURE

B: INITIAL RESEARCH WITH STAKEHOLDERS

223. Section A summarises evidence from the literature on humane education interventions and relevant findings from biology education and the field of cognitive development.

224. Section B describes our approach to understanding the stakeholder perspective. During Year 1, we administered an on-line survey targeting animal welfare organisations working with children and young people. The findings from this survey will inform the design of a protocol for further work with stakeholders and schools. In addition, with the stakeholders' permission, we will examine the materials they use in light of the findings from our literature review. This section focuses on the development of the on-line survey and the findings from the animal welfare organisations we approached.

IV A: Evidence on interventions from the published literature

Enhancing children's attitudes, knowledge, empathy and behaviour towards animals

225. The purpose of this section of the report is to review published research studies that have attempted to improve, through various forms of educational intervention, children's understanding of, and attitudes, empathy and behaviour towards, animals. There is very limited research directly assessing interventions designed to specifically improve children's care of animals and their sense of responsibility for animal care and welfare. However, following our review of the humane education literature, we will consider key findings from a broader literature emerging from biology education and cognitive development research that attempts to enhance children's knowledge about and attitudes towards animals.
226. Throughout this review we will consider: the type of intervention implemented; the age range of children included; the outcome targeted (attitudes, empathy, knowledge and/or behaviour); the method of evaluation used, and the effectiveness of the intervention.

The evidence base on 'humane' education and improving child-animal interactions

227. Humane education aims to instil, reinforce, and enhance young people's knowledge, attitudes, and behaviour toward the kind, compassionate and responsible treatment of human and animal life (Ascione, 1997). Humane education interventions also have the potential to discourage children from behaving in abusive ways towards animals (Thompson & Gullone, 2003).
228. The development and evaluation of humane education interventions was particularly popular in the 1980's and 1990's and although interest appeared to diminish, research is starting to resume in this area. Most of the research carried out so far has been undertaken in Australia and the United States, with very little literature from the UK context. The points below summarise the existing published research on humane education interventions (relating to animals) and consider the degree of success each intervention achieved. Table IV A. 1 provides a précis of the published studies.
229. Importantly, Arluke (2003) argues that an array of factors contributes to children's humane behaviour and that all of these need to be targeted when attempting to educate children who do not possess such inclinations. Arluke investigated the notion of 'supernurturance' (i.e., children who have a strong inclination to think and behave humanely towards animals) through interviewing 30 children and parents attending a pre-veterinary summer camp. Children were selected on the basis of a motivation letter where they had to demonstrate their interest in animals and the following themes were identified as important aspects to include within interventions: validating the importance of animals; teaching nurturance; identifying oneself as an animal person, seeing animals as helpers and assuming responsibility.

Key interventions in the published literature

230. Below are details of seven successful interventions on humane education that have been evaluated in the United States and Australia:
- (a) Fitzgerald (1981) compared different types of interventions in fifth and sixth grade classrooms (10 to 11-year-old children). Four conditions were employed: Repeated Treatment (RT), where a master teacher presented four humane education lessons over a 2-month period; Intensive Treatment (IT), in which the same information was covered in a single class session; Light Treatment (LT), which included reading

material with no direct instruction; and a Control Condition, where no intervention occurred. A “fireman test” was used in the pre- and post-tests to assess the degree of change in children’s attitudes towards animal life. Children were asked to select, from a list of inanimate possessions and pets, which they would attempt to rescue from a burning home. The mean score for the IT condition was significantly higher (more humane) than those for the three other groups, suggesting that a focused classroom presentation conducted by a master teacher is an effective means of enhancing humane attitudes.

- (b) Malcarne (1981, described in Ascione, 1997) studied a small group of third and fourth graders (8 and 9-year-old children) to assess the effects of drama and role-playing on children’s empathy and prosocial behaviour towards humans and animals. One third received dramatisation and role-playing experience related to human victims of distress, one third with animal victims and the remainder were read a story on dogs followed by a discussion. There was no pre-test but all the children were post-tested and those in each of the three intervention groups scored higher than children in the other groups in the areas for which they received training. This suggests that 8 and 9-year-olds are able to learn about humane behaviour towards animals and humans through role-play.
- (c) Cameron (1983) investigated two forms of humane education and their effects on animal-related attitudes in 13 year-old children. Two classrooms were given reading material and media presentations (PRINT) and two others were given presentations and lectures (LECTURE). Three classrooms were used as control groups. The instructions in the PRINT and LECTURE groups lasted for three school weeks (approximately 14 hours). All children were pre- and post-tested and the results revealed more positive post-test attitude scores in the PRINT and LECTURE groups. Cameron concluded that printed materials and lectures were both effective means of educating children.
- (d) Ascione, Latham & Worthen (1985) assessed the effects of a school-based intervention implemented by teachers, who, along with pupils (kindergarten through to 6th grade; 4 to 11-year-olds) were randomly assigned to an intervention or control condition. In the former, teachers implemented the National Association for Humane and Environmental Education’s (NAHEE) curriculum guide over the course of the school year (10 hours in total). Children were pre- and post-tested on their attitudes to companion and non-companion animals and results showed higher attitude scores in the intervention group but only for kindergarten children and first graders (six-year-olds). However, older children tended to have more positive attitudes to animals than younger children at baseline, so it is possible that these children may not have scored significantly higher even if their attitudes had improved.
- (e) Following the above study, Ascione (1992) re-assessed the impact of a year-long school-based education programme. The NAHEE programme was used with KIND News (a weekly newsletter covering animal-related issues) with children aged 6, 7, 9 and 10 and the teachers in the intervention group were asked to spend a minimum of 40 hours on the subject (as opposed to 10). The children were pre- and post-tested using self-reported measures of humane treatment and empathy toward animals. No significant differences were found between the intervention and control groups for 6, 7 and 10-year-old children. However, the humane attitudes of 9-year-old children in the experimental group improved. To investigate if these effects were maintained, Ascione and Weber (1996) carried out a one-year follow-up, where over 80% of the original sample were located and retested. They found the children who had received training still had higher humane attitude scores than those who had not been trained, suggesting that humane education can be effective and sustainable, but age is clearly an important factor that needs to given careful consideration.

- (f) Coleman, Hall & Hay (2008) investigated the effect of the Responsible Pet Ownership Program (RPOP) aimed at improving children's interactions with dogs in order to prevent bite attacks. Immediate and long-term learning outcomes of the RPOP were assessed, as well as the impact of class size with 5 to 6-year-old children. The programme assessed children's ability to identify potentially dangerous dogs through canine body language, their knowledge of how to interact with dogs and their knowledge of different aspects of responsible pet ownership. Structured interviews were used within the pre-test and two post-tests (the first within two weeks of RPOP and the second two to four months later). These assessed children's responses to cartoon and photographic images of three dog emotions, short answer questions and role-play. Those participating in the programme were better able than those who did not participate to correctly identify emotions in cartoon, photographic and video depictions of dogs and their knowledge of responsible pet ownership was more comprehensive. However, there was little long-term retention of this information, whereas children's role-play responses to interactions between a dog and its owner persisted for 4 months after RPOP. There was also specificity in the knowledge that children (i.e., they could not correctly interpret a happy dog and the RPOP did not include this emotion). This provides support for the improvement being attributed to the materials used.
- (g) Nicoll, Trifone & Samuels (2008) investigated the effect of WLA! (We Love Animals!), an in-class humane education programme and the efficacy of a popular printed humane education publication. The WLA is a six-lesson programme carried out over a four month period with each lesson approximately 25-30 minutes and aims to foster positive attitudes, encourage empathy and understanding of animals and heighten awareness of their needs and quality of life. Children's attitudes and the extent of bonding with a companion animal were assessed before and after the intervention (using the Pet Attitude Scale and the Companion Animal Bonding Scale). The in-class component (but not the printed material) enhanced attitudes toward nonhuman animals, compared to those who did not participate. However, neither the printed nor the in-class material affected the self-report measure of interactions with a pet, suggesting that an in-class approach can change children's attitudes, but it might not change behaviour.
231. Recently, a number of studies have investigated the effect of training children to improve their relationship with animals in order to prevent injuries (e.g., through dog bites and farm hazards). These were found to be effective in educating children on various aspects of understanding animals' behaviour from the very young (4-years-old) up to adolescence (Chapman, Cornwall, Righetti & Sung, 2000; Coleman, Hall & Hay, 2008; Spiegel, 2000; Page & Fragar, 2001; Wilson, Dwyer & Bennet, 2003).
232. The evidence presented above suggests that humane education (in respect of animals) is an effective way of increasing children's knowledge of how to behave toward animals. However, it is evident that more research is necessary in this field and particularly within the UK, in order to assess in depth which approaches to intervention are most effective and whether we need different approaches for different age groups.
233. It is also important to examine teachers' perspectives if they are to play a central role in the implementation of interventions. Teachers, it has been argued, are more receptive to a focus on *affect* in terms of inculcating a value commitment to the protection of animals, rather than the cognitive aspect (or what to do about that value commitment) (Finch, 1989).
234. We now turn to the literature on biology education and cognitive development to further examine issues of pedagogy (educational method) that will support the development of effective interventions.

Table IV A. 1: Published findings from interventions to promote positive behaviour towards animals in children

Authors, year, country, focus	Programme, aims, age group, sample size	Measures used (pre-/post-test)	Key findings/ conclusions
<p>Coleman, Hall & Hay (2008)</p> <p>Australia</p> <p>Interactions with dogs (to prevent bite attacks prevalent in this age group)</p>	<p>Responsible Pet Ownership Program (RPOP)</p> <p>Aims: to assess the immediate and long-term learning outcomes of the RPOP and investigate the impact of class size on learning outcomes</p> <p>Children in preparatory year of primary school (5-6 years old)</p> <p>30 minute programme by credited trainer and temperament-tested dog</p> <p>126 pupils from small class (25), medium (50) and large (75)</p>	<p>Ability to identify potentially dangerous dogs through canine body language</p> <p>Knowledge of how to interact with dogs</p> <p>Knowledge of aspects of responsible pet ownership</p> <p>Immediate: within 2 weeks of RPOP Long term: 2-4 months after RPOP Control group</p> <p>Structured interview to assess effects: Children's responses to cartoon and photographic images of three dog emotions, short answer questions and role-play</p>	<p>Those participating in programme showed better capacity to correctly identify emotions in cartoon, photographic and video depictions of dogs compared with those who did not participate. Their knowledge of responsible pet ownership was also higher.</p> <p>There was little long-term retention of information. However, children's role play responses to interacting with a dog and its owner persisted for 4 months after RPOP.</p> <p>There was specificity in the knowledge that children received from the programme (i.e., they could not correctly interpret a happy dog from a cartoon representation – the RPOP did not include this emotion). Provide support for improvement being attributed to the material used.</p> <p>Intensive follow-ups are recommended and information needs to be reinforced in home or school environment (information packs for parents).</p>
<p>Spiegel (2000)</p> <p>United States</p> <p>BARK (Be Aware, Responsible, and Kind) Dog Bite Prevention Program</p>	<p>Aim: The programme aimed to inform elementary school aged children how to avoid and prevent threatening situations that may lead to attacks.</p> <p>Age group: approximately seven to nine years old</p> <p>Sample size: 486 children from 7 schools from Montgomery and Prince George's Counties in Maryland, USA</p>	<p>The participants were given a questionnaire approximately two weeks before and after the educational intervention. These aimed to gather information about children's interactions, encounters, or relationships with dogs and also their understanding of dog behaviour and how to prevent dog bite related injuries.</p> <p>The educational intervention lasted 60 minutes and was composed of an introduction and interactive discussion of dog bite safety using a workbook, the viewing of a video, role playing with two life sized toy dogs and a conclusion which included the distribution of a colouring and activity book to take home. The book also included a section aimed at the parents or guardians of the child.</p>	<p>The programme appeared to be highly effective in helping children understand how to prevent or avoid potentially threatening situations involving dogs. For example, in the pre test the students often confused the warning signs of a scared dog versus an angry dog while in the post test the number of correct answers increased from 80% to over 96%. This study illustrates that children between the ages of seven and nine years can learn about dog bite prevention and that they remember the information up to two weeks later. However, the programme was found to be most effective for older participants.</p>

<p>Chapman, Cornwall, Righetti, & Sung (2000)</p> <p>Australia</p> <p>Dog bite Prevention Programme</p>	<p>Aim: The study investigated the effectiveness of a dog bite prevention programme</p> <p>Age group: seven to eight year old children</p> <p>Sample size: 346 children from 8 primary schools in metropolitan Sydney</p>	<p>The intervention consisted of a 30 minute lesson by a dog handler and a dog, demonstrating how to behave around dogs and other related information such as how to recognise friendly, angry, or frightened dogs and how children should approach dogs. For example, the children were taught how to pat a dog safely, that is asking permission, approaching slowly, extending the hand palm down, patting the dog under the chin and on the chest, avoiding eye contact, walking away slowly and quietly.</p> <p>Seven to ten days after participating in the program, children in the intervention schools were let out to play unsupervised in the school grounds where a docile Labrador dog was tethered five metres away from its owner, without telling the children it would be there. In the schools where there had been no intervention the children were sent out to play in similar circumstances.</p> <p>The children were videotaped by a hidden camera for 10 minutes, the videos were then analysed to assess the number of children who breached the proscribed behaviours (for example patting the dog incorrectly).</p>	<p>Children who had received the intervention displayed greater precautionary behaviour than children in the control schools (who had not received any intervention). For example, the children who had been trained to behave safely around dogs typically observed the dog from a distance. A few of them patted the dog but they did it only after careful assessment of the dog's behaviour, whereas children who were in the control group did not take such precautions and patted the dog without hesitation. This prevention programme was effective and showed that children are able to use what they learn during the prevention programme to interact with a real dog.</p>
<p>Wilson, Dwyer & Bennet (2003)</p> <p>Australia</p> <p>Dog bite Prevention Programme for preschool children</p>	<p>Aim: The general aim of this study followed Spiegel's (2000) and explored the precautionary behaviours of children. They investigated parents' beliefs about their children's behaviour around familiar and strange dogs, and evaluated the impact of a brief educational dog safety programme on kindergarten children</p> <p>Age group: preschool children (mean= 4.68 years)</p> <p>Sample size: 192 children from 7 kindergartens in the Eastern suburbs of Melbourne.</p>	<p>The children were presented with photographs showing dogs in different scenarios.</p> <p>The children were tested before the intervention and four weeks after the intervention.</p> <p>The participants were divided into four groups: control (no intervention), parent information (only parents were given an information brochure), child programme (children only participated in the program) and parent and child programme (children participated and parents were given a brochure).</p> <p>The programme lasted 30 minutes and was divided into two parts, the first part educated the children about how to behave if confronted by a dog, the second part taught them how to identify risks such as a dog sleeping as well as how to interpret the body language of the dog. This was done by using</p>	<p>The data from the questionnaire given to the parents revealed that many children engage in unsafe behaviours around dogs and that parents are largely unaware of the dangers associated with such behaviours. The dog safety programme resulted in a significant increase in the ability of children to identify high risk situations for up to eight weeks in all three experimental groups. The benefits were lower for the children who had not received any training but whose parents had been given the information regarding safe behaviours around dogs and highest in those children who had received training and whose parents were also given information.</p>

		<p>photographs (different from the ones used in the pre and post tests) depicting dogs in different poses and teaching the children which dogs are safe and not safe to approach. The children were encouraged to role play desired behaviours by using puppets.</p>	
<p>Page and Fragar (2001)</p> <p>Australia</p> <p>Prevention of child injury on farms.</p>	<p>Aim: evaluates the effectiveness of the 'Spot the Hazard' farm safety resource which employs 3-D visual stimuli to develop rudimentary risk assessment skills in children.</p> <p>Age group: all primary school children mean age of 8.86</p> <p>Sample size: 79 students from three local primary schools in north-west New South Wales</p>	<p>The resource used was a portable model farm</p> <p>2 experimental and 1 control group</p> <p>experimental group1 : Children were instructed to gather around a model farm and only to look at the scene, not to touch it. A semi-structured conversation would be facilitated to ensure that all ten hazards were addressed</p> <p>Further interviews at 14 and 28 days were also completed with the use of the model farm.</p> <p>Experimental group 2: same as group 1 but no model farm used in the post tests</p> <p>Control group: students participated in a farm safety discussion in small groups, but no model farm used</p> <p>Children's recall of the hazards and the extent to which they compared the resource to their own farm was assessed</p> <p>after an initial presentation at post-tests of 1, 14 and 28 days, across three experimental groups.</p>	<p>Group 1, the group exposed to the model farm at pre-test and post-test, recalled the greatest number of farm hazards and made more comparisons with their own farm. In comparison Group 2, the group exposed to the model only at pre-test, recalled fewer hazards and made fewer comparisons. However, both groups made more responses on both questions than the control group. These results suggest that modes that employ both visual and verbal stimuli in imparting farm safety knowledge to children are more effective than purely verbal approaches.</p>

Research on biology education and cognitive development

235. One of the key issues facing science educators is how to ensure that the interventions they develop and implement enhance children's knowledge and improve attitudes. A classic finding within science education is that children's naïve concepts are resistant to change and may act as barriers to learning (e.g., Driver, Asoko, Scott & Mortimer, 1994). In this sense, educational programmes can often take on the role of being corrective or remedial rather than formative (Bixler, Carlisle, Hammitt & Floyd, 1994). Many interventions to enhance knowledge and achievement also prove to be unsuccessful or have only short-term learning gains. However, the finding that naïve concepts are resistant to change has led to the generation of a range of school-based educational approaches that aim to actively engage with and reformulate children's knowledge of and attitudes towards animals.

Direct experience of animals

236. A consistent finding across a wide range of research is that providing opportunities for children to interact with and care for animals enhances their understanding of animal care and life processes as well as their attitudes towards animals. This finding has been demonstrated throughout the various sections of this report. Pet ownership (Inagaki, 1990) and zoo exhibits are effective means of enhancing knowledge and attitudes (Heinrich and Birney, 1992). Zasloff, Hart & DeArmond, (1999) found in a survey of USA teachers that many biology teachers keep animals in the class as a means of enhancing biology teaching. In a USA study where a dog was present in a class of 46 first-graders for 3 months, gains were found in the social and cognitive development of children (Hergovich et al., 2002). In the UK, it is no longer accepted practice to keep animals in schools to enhance children's attitudes and knowledge towards animals; therefore, other means of intervention are required.

Active learning and cognitive conflict

237. A range of materials have been employed in intervention research, including: workbooks, stories, science demonstrations, role-play, and props such as puppets and toys. The key to an intervention's success, however, is not only whether it is interesting and engaging for children, but more importantly the extent to which it stimulates children to critically reflect on their existing knowledge.
238. In order to encourage children to change their naïve concepts of biology, science education theory suggests that interventions should necessitate some form of cognitive development, cognitive change or cognitive exchange (Pine & West, 1986). If children's concepts are radically different from accurate scientific concepts then interventions that explicitly put the child's naïve concepts into conflict with a formal science concept and demonstrate accuracy of the latter, lead to measurable improvements in knowledge. This is often referred to as a process of creating cognitive conflict.
239. Williams and Tolmie (2000) conducted a short-term school-based intervention with 8 to 12-year-olds to enhance concepts of inheritance and genetics. The intervention was designed to foster cognitive conflict through a workbook. Children in the cognitive conflict condition improved significantly more than children in a control group (who received no intervention) at the 6-week post-test. Interventions that fail to engage children's existing knowledge are far less effective (Williams & Affleck, 1999).
240. Children aged 10 to 11 have more positive attitudes towards rabbits (prey) than wolves (predator), while older children (12 to 15-years-old) do not show such a difference in attitude (Prokop & Kubiak, 2008). This may reflect a switch from affective to cognitive abilities, with older children having a better understanding of the role of predator and prey within ecosystems. Children's ecological thinking develops around the age of 9 to 12 years.

Peer collaboration and learning

241. An effective means of creating cognitive conflict and cognitive change is through collaborative learning where children participate in group-based interventions. This pedagogical approach is based on psychological theories that highlight the importance of social aspects of learning (e.g., Joiner, Littleton, Faulkner & Miell, 2000).
242. Williams and Tolmie (2000), outlined above, also included a collaborative learning condition in their research on 8 to 12-year-olds' inheritance concepts and found that this condition was the most effective in improving children's knowledge at the 6-week post-test. Williams and Binnie (2002) evaluated an intervention to improve 4 and 7-year-olds' understanding of illness. The children were interviewed and half were placed in an intervention condition based on group discussion designed to foster cognitive conflict. The remaining children did not participate in an intervention. A one-week post-test showed that children in the intervention condition improved significantly more than children in the control group.
243. Group interactions are also an effective means of educating young children about injury prevention, including injuries incurred through children's interactions with animals (Bruce & McGrath, 2005; Page & Fragar, 2001).

Fact sheets, videos and provision of factual information

244. A cost-effective way of providing information relevant to DOC to children is through fact sheets, websites, and videos. These can also potentially reach a wide audience. However, findings on the effectiveness of these minimal interventions have been mixed.
245. Myant and Williams (2008) found that simple provision of factual information was as effective as cognitive conflict-based collaborative learning approaches to enhance understanding of illness. They interviewed 7 to 11-year-olds to establish children's naïve concepts of illness. Children then participated in one of three intervention conditions: collaborative learning, collaborative learning with factual information, or factual information alone. The results at a post-test interview showed all interventions led to similar levels of improvements in knowledge, suggesting that in this instance simply providing age-appropriate factual information would have been sufficient, and a less costly means, of improving children's knowledge.
246. However, providing children with factual information does not always lead to knowledge gains. Williams and Affleck (1999) conducted an intervention study with 4 and 7-year-olds aimed to improve understanding of inheritance. All children were initially interviewed and then half participated in an intervention designed to provide age-appropriate factual information. Children were post-tested immediately after the intervention and then 4 weeks later. The results showed no evidence of improved knowledge among the intervention children and this was due to the level of factual information provided. For "fact based" interventions to be successful, the information must be more advanced than children's existing knowledge but not so advanced that they cannot understand it. The careful tuning of factual information to the age and prior knowledge of children is essential for this method to lead to knowledge gains.
247. Using the combination of both fact sheets and videos is more effective than using one or the other in conveying information to children. Holzheimer, Mohay & Masters (1998) assessed the effectiveness of a video tape and picture book designed to teach preschool children about the prevention and management of asthma episodes. The greatest improvement was noticed in the children who had used both the video and the book. The book was more effective than the video because it allowed parents to direct the children's attention to the contents about which they had less knowledge. Finally, they suggested that information should be repeated over time for the intervention to be more successful.

Parental and school involvement

248. A common finding is that the impact of interventions is short-lived. Re-administering the educational intervention is the most efficient way of reducing the effect of forgetting over time, but this can be costly. Informing the parents may be useful because they will then have the chance to repeat the information to the children and therefore minimise this effect. The development of appropriate fact sheets for parents to take home is therefore an effective means of ensuring that children retain the information.
249. Involving the school and teachers in interventions and embedding key elements of the intervention within other parts of the curriculum will reinforce the learning outcomes of an intervention designed to promote a DOC towards animals.

Summary & implications for interventions to promote a DOC

250. *Interventions have to be interactive in order to be effective in promoting children's DOC towards animals, for example, incorporating collaborative learning processes or direct contact with animals to fully engage children.*
251. *Research evidence suggests that different pedagogical approaches can be effective. Collaborative learning seems very successful in some circumstances but in other situations simple factual information has been demonstrated to be effective. Multiple approaches within an intervention might enhance the outcomes for children.*
252. *The interventions employed to promote a DOC should be tailored to the age and experiences of the children involved.*
253. *Evaluations have to be planned in advance and be systematic. Ideally, a range of outcomes relating to DOC towards animals should be measured including: attitudes, knowledge, empathy and behaviour. Evaluations should be done in the short and long-term to measure the longevity of gains following educational interventions.*
254. *To enhance long-term gains of interventions aimed at children, parents and teachers should also be engaged within the intervention process so that key messages from the intervention are reinforced in school and at home.*

IV B: Initial research with stakeholders

Background

255. In addition to Defra, there are a number of other stakeholders with a potential involvement in promoting a DOC to young people. Some of these (e.g., Non-Governmental Organisations) are already involved directly in promoting animal welfare. Others (e.g., the Veterinary Profession, the European Union) have a more strategic and long-term interest in animal welfare. The Department for Children, Schools and Families, the Qualifications and Curriculum Authority (QCA) and the Department of Education in Scotland will be important facilitators of any planned interventions. It is clearly important to understand how these different bodies see the issues involved in promoting animal welfare to children and to use that information in any recommendations for future interventions and research needs. This section describes our initial work with animal welfare organisations that target children and young people.

Aims and objectives of the stakeholder research

256. The main aim of this research was to explore the existing remit, role and activities of animal welfare organisations that target children and young people.
257. Specific objectives were to assess stakeholders' views on:
- (a) the interventions and resources that they are currently using to educate children and young people;
 - (b) the effectiveness of different types of interventions/resources; and
 - (c) their organisation's willingness to have their resources evaluated and/or be involved in the process of employing evidence-based interventions and resources in the future.

Survey development and administration

258. A survey was created in order to investigate stakeholders' views on the promotion of animal welfare to children and young people. The survey included questions on various aspects of the promotion of animal welfare developed by the research team (see Appendix 3 for a copy of the survey).
259. The survey questions were organised into 6 sections:
- (1) History of working with children and young people
 - (2) Promoting animal welfare to children and young people
 - (3) Visits to schools
 - (4) Specific targets
 - (5) Effectiveness of different approaches
 - (6) Resource evaluation

The questionnaire was placed online using Limesurvey software and e-mails asking for participants to access it were sent to target organisations. A link to the survey was also included on the project website below. Participants were asked to complete the questionnaire within a two-week period and a follow-up message was sent as a reminder to organisations that had not completed the questionnaire by this date.

<http://www.education.ed.ac.uk/cahru/research/dutyofcare.php>

The sample

260. Thirty six national and international organisations were targeted (see Table IV B.1). Purposive sampling was used to identify organisations that were expected to play a role in promoting care for animals to young people. The focus was on UK organisations, although a number of international organisations were included.
261. In total, 22 complete responses were obtained. In some cases, the survey was sent to more than one person within an organisation. In two cases the survey was completed by two different people within the same organisation. The responses for the two people in each organisation were merged into one in order to have one response for each organisation. The sample is, therefore, composed of 19 different organisations.

Table IV B.1: Participants in the on-line survey

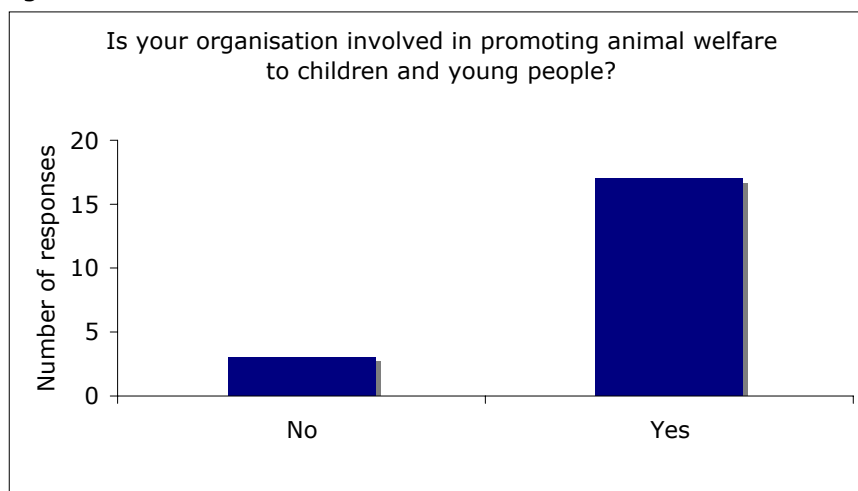
Organisations that completed the survey and are involved in promoting animal welfare to children and young people	
1.	Association for the Study of Animal Behaviour (ASAB)
2.	Cats Protection
3.	Compassion in World Farming
4.	Department of Clinical Veterinary Science, University of Bristol
5.	Directorate General Health and Consumers, European Commission (Head of Unit, Animal Welfare)
6.	Directorate General Health and Consumers, European Commission (Communication Officer, Animal Welfare)
7.	Scottish Society for the Prevention of Cruelty to Animals (SSPCA)
8.	PDSA for pets in needs of vets
9.	Reaseheath College, Nantwich
10.	Royal Society for the Prevention of Cruelty to Animals (RSPCA)
11.	Society for the Protection of Animals Abroad (SPANNA)
12.	The Blue Cross
13.	The Brooke
14.	The Horse Trust (Education Officer)
15.	The Horse Trust (Education Officer)
16.	World Society for the Protection of Animals (WSPA)
17.	Dogs Trust
18.	Welsh Assembly
Organisations that completed the survey and are not involved in promoting animal welfare to children and young people	
1.	Cambridge Vet School
2.	World Organisation for Animal Health (OIE)
3.	Scottish Government

Findings from the stakeholder research

Number of organisations working with children and young people

262. The first section "History of working with children and young people" included general questions on the organisation and its role in promoting animal welfare to children and young people.
263. Most of the organisations that completed the questionnaire do have programmes for promoting animal welfare to children and young people (Figure 1). Those who replied that they do not have such programmes were directed to the end of the survey. A total of 17 organisations reported having such programmes.

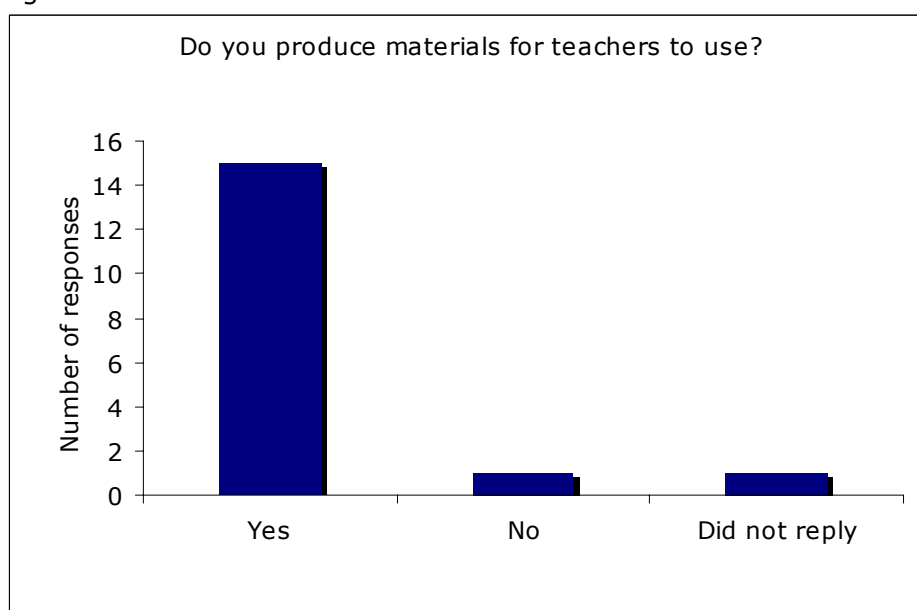
Figure 1



Types of programmes used for promoting animal welfare

264. The second section "Promoting animal welfare to children and young people" aimed to investigate the types of programmes being used to promote animal welfare.
265. Most organisations produce materials for teachers that are specifically designed for school use (Figures 2 and 3). Most use a combination of discussion, paper and computer-based materials; however, computer-based material is used a little more often – see Figure 4). Most organisations are likely to prefer this method as it is the most cost-effective and time-efficient method of targeting large groups of children and young people. Computer and printed materials can be distributed to a large number of people in very little time, particularly when compared with training teachers directly. In addition, websites can be accessed by children and teachers anytime, allowing them to learn at their own pace.

Figure 2



266. Providing lesson plans or group discussion activities for teachers may be more effective in terms of enhancing children's knowledge, as it requires greater interaction. In this way, children may be more likely to get involved. However, these methods require more time from both the teachers and the organisations and may therefore not be as time and cost-effective as computer-based material. Using printed material,

such as workbooks to give to teachers who will then distribute them to children is often considered time and cost-effective. It has similar advantages to computer-based material; however it may not be as appealing to older children who are now used to spending a lot of time on computers using interactive tools. On the other hand, printed material can be used for children of all age groups, because books with simple text and pictures can be used with very young children, while computer-based material may not be very effective with children below the age of seven.

Figure 3

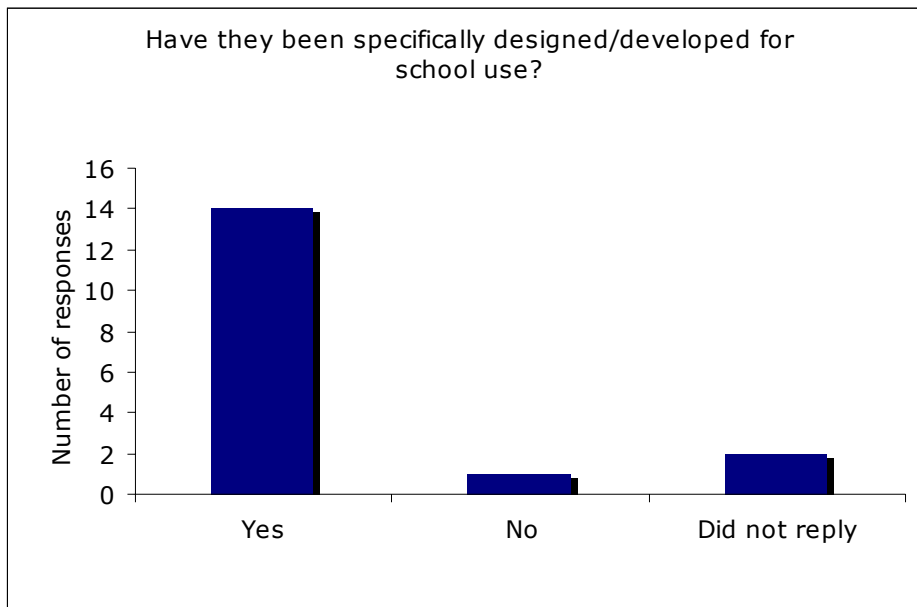
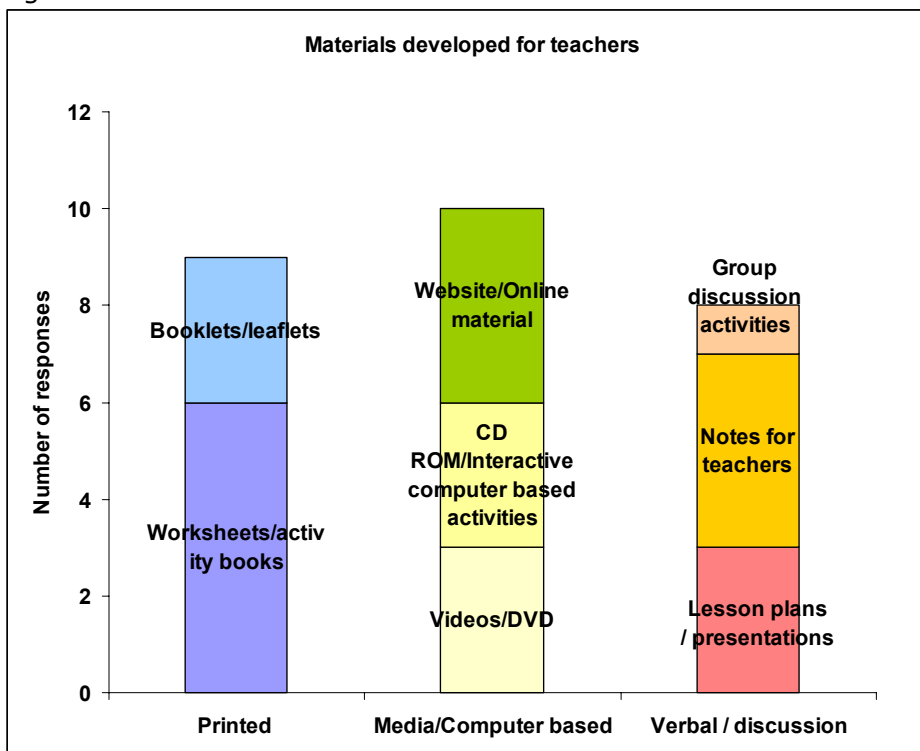


Figure 4



Collaborations

267. Stakeholders were also asked if they work in collaboration with youth organisations and/or veterinarians. Approximately half said that they do (Figure 5 and 6). Most of

the stakeholders who reported working with youth organisations said that they help Brownie, Beaver and scout groups to work through their animal badges. One organisation reported working with individuals with phobias. Most of the organisations who reported working with veterinary clinics said the reason for doing so was for referral of cruelty cases (from clinics to the organisation). Only one organisation reported providing literature on pet care for the clients of the veterinary clinics.

Figure 5

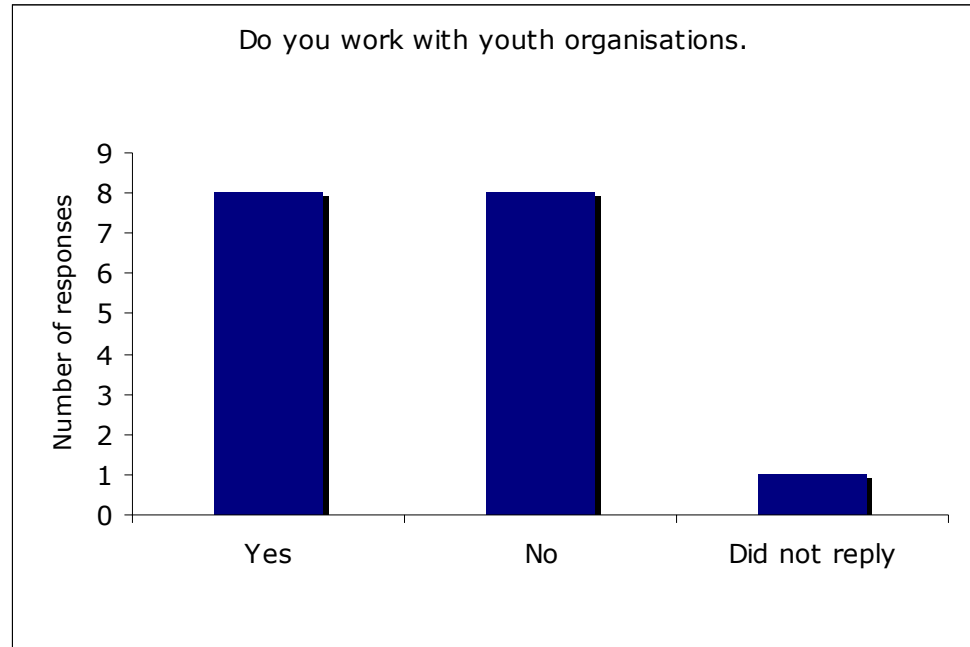


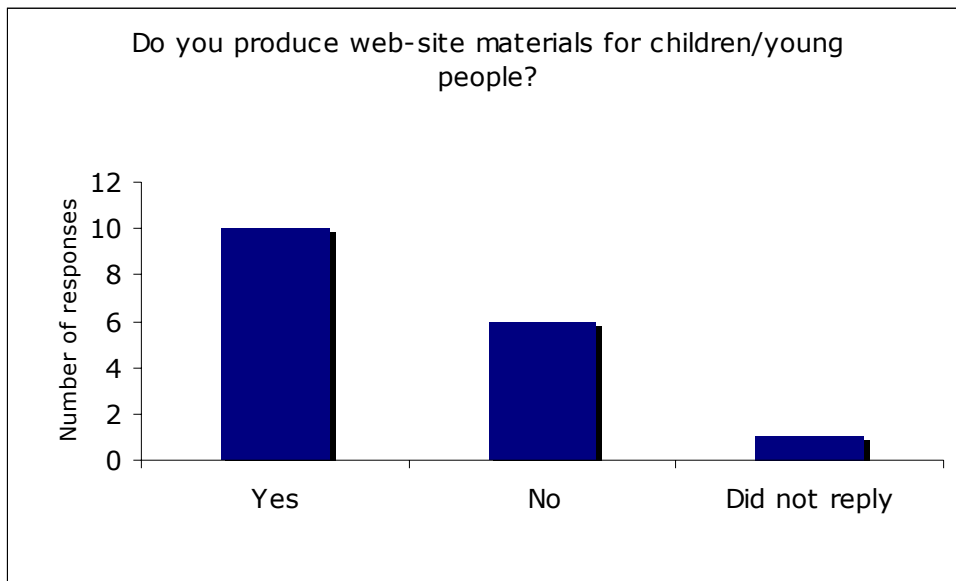
Figure 6



Strategies used

268. The last few questions of Section 2 asked about the production of website material and/or other strategies used. Most reported using website material containing information on animal welfare for children (Figure 7). When asked about other strategies used for promoting animal welfare to children and young people, most reported visiting schools and a few reported organising events for children (e.g., events at farms). These were explored further in Section 3 of the questionnaire (see below).

Figure 7



School visits

269. The third section of the questionnaire "Visits to schools" investigated the type, and extent, of activities carried out at schools.
270. Most stakeholders reported carrying out school visits (Figure 8). When asked about the scale of their school work, most reported employing between 1 and 10 staff members and having visited 30 to 100 schools in the past year (Figure 9 and Figure 10). The most common activities carried out in schools were giving talks and running demonstrations (Figure 11).

Figure 8

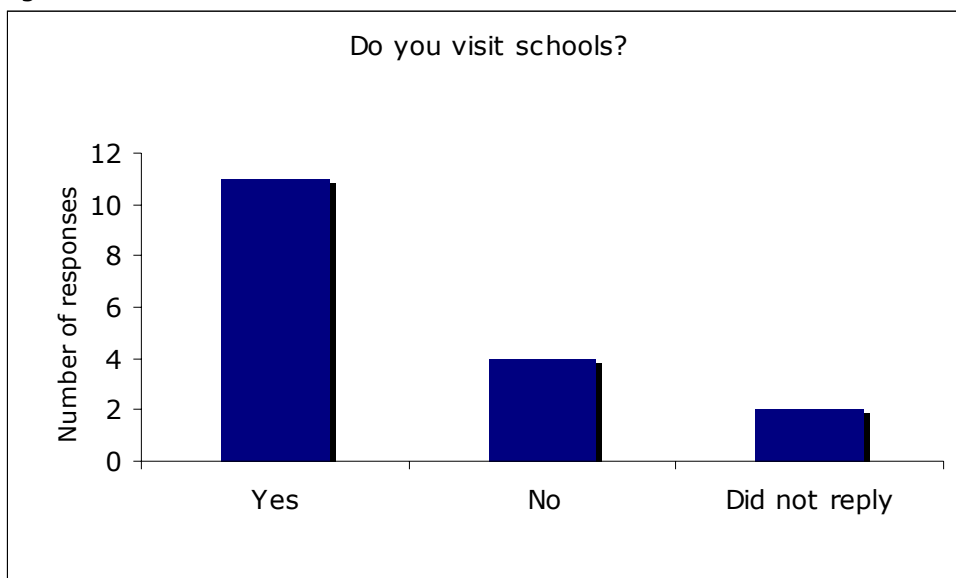


Figure 9

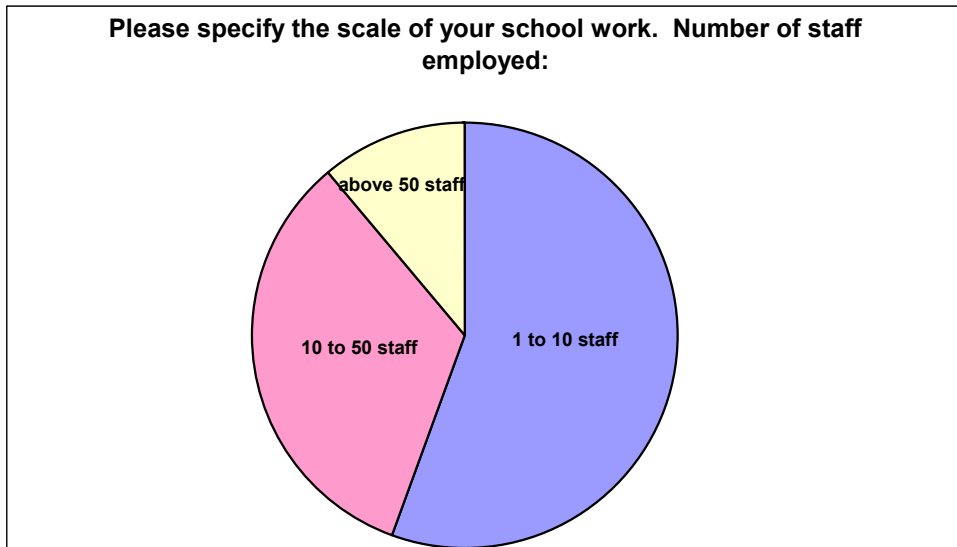


Figure 10

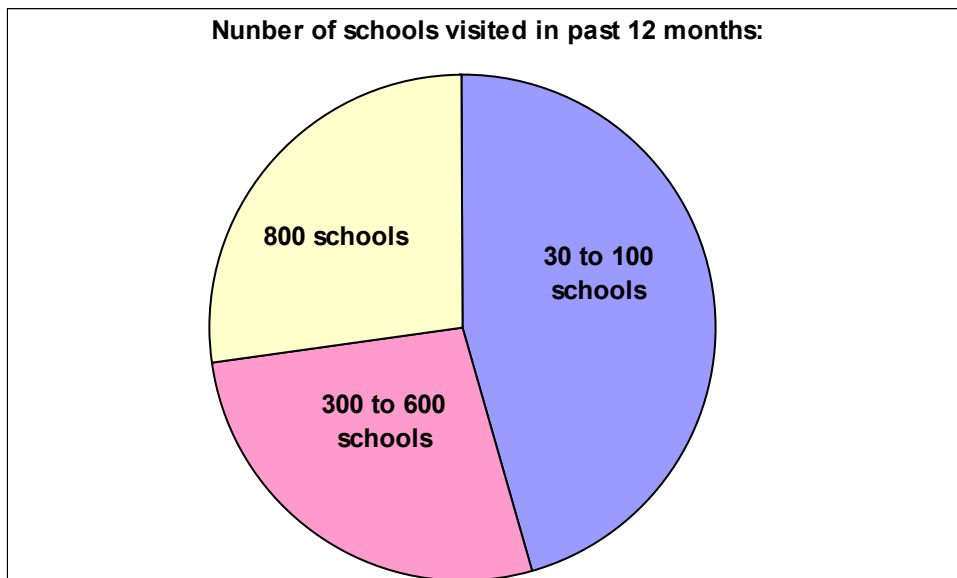
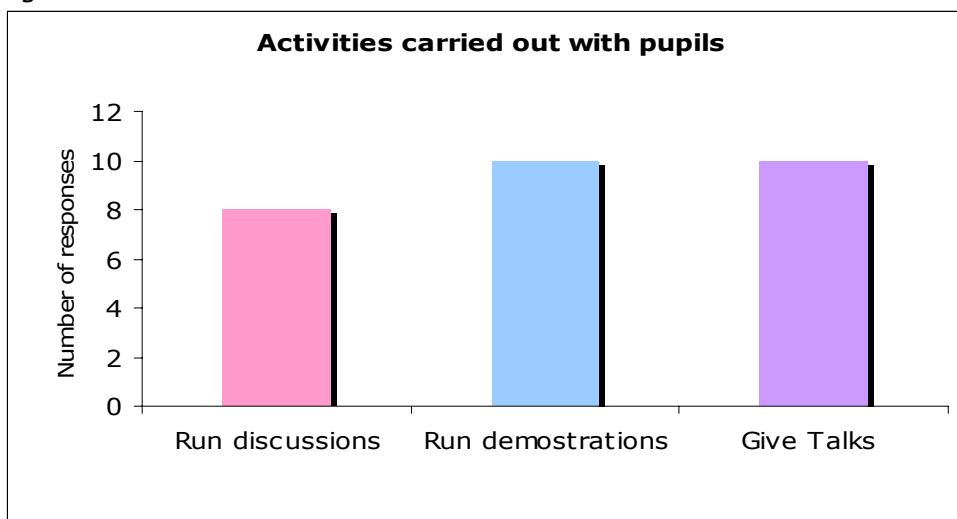


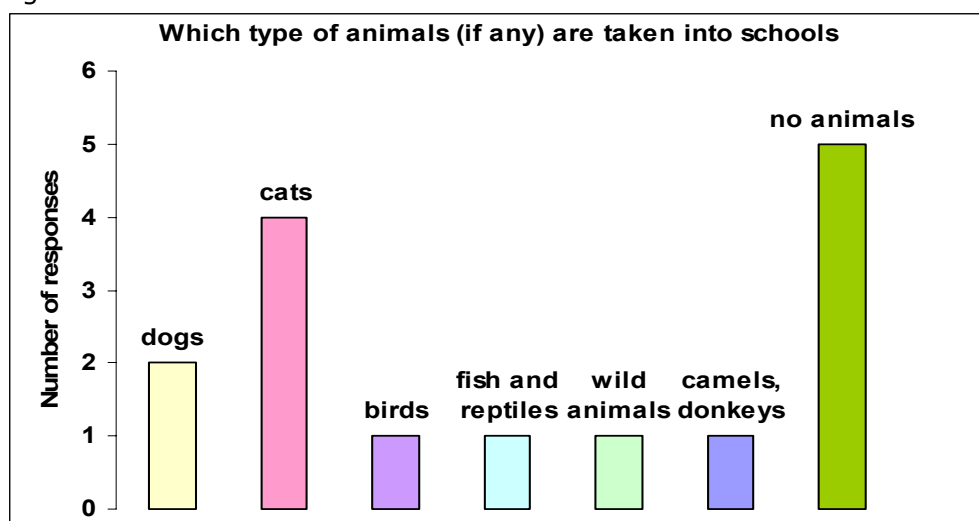
Figure 11



271. Half of the organisations who do run programmes in schools also take animals with them. The most commonly used animal is the cat (Figure 12), perhaps because they

are appealing to children, they can interact with them easily and they are relatively safe and easy to take to schools. One organisation focusing on the welfare of working animals in Africa, Asia and the Middle East reported taking camels and donkeys to schools.

Figure 12



Targets and aims

272. The fourth section "Specific Targets" investigated the age groups and type of animals targeted, in addition to the specific aims of the organisation.
273. Most organisations target 8 to 11-year-old children in their educational programmes (Figure 13).

Figure 13

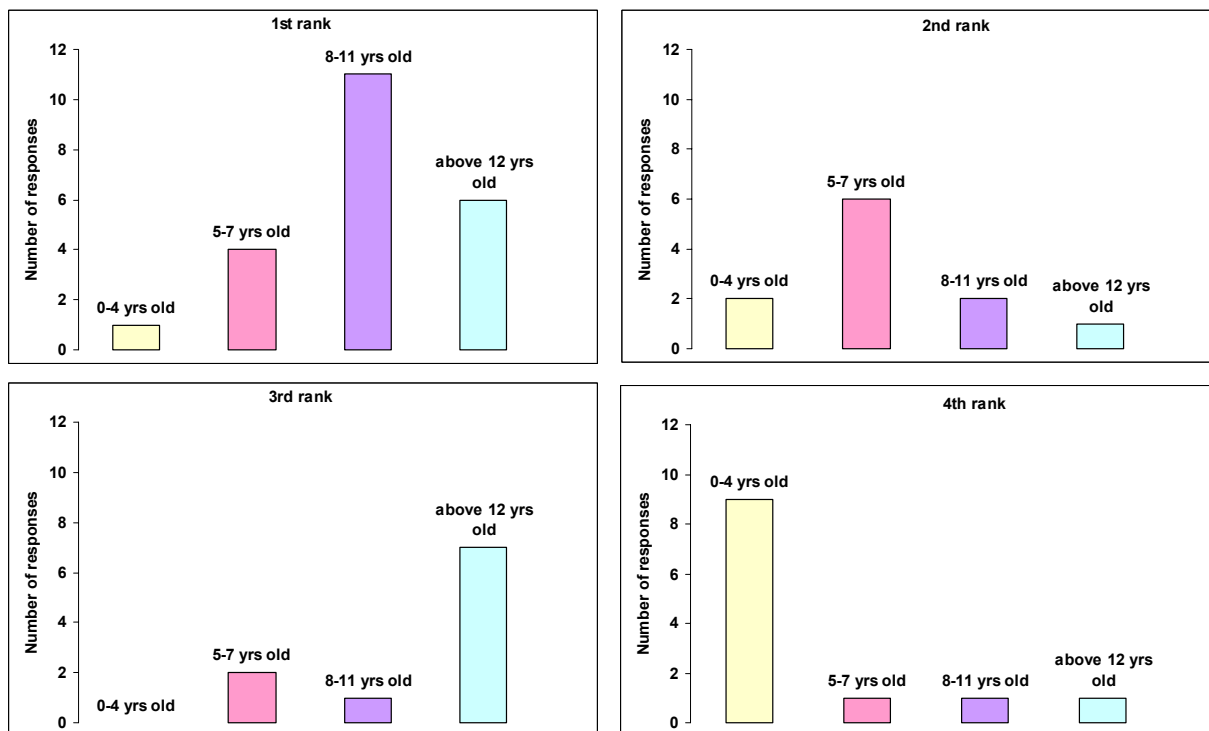


274. When asked to rank the different age groups with respect to their priority for interventions, 8 to 11-year-olds were given the first rank most often while 0 to 4-year-olds were ranked first by only one organisation and were the most likely to be ranked last (Figure 14). The reason why 8 to 11-year-olds are targeted is perhaps because these organisations have noted that this age range is most open to learning about animals (see section on Interventions). In addition, children at this age are capable of reading material by themselves and of using computers efficiently and can therefore be educated through several different types of materials, such as training in class,

printed workbooks and leaflets, and computer-based material. Younger children may not be able to do so. The organisations' views on the effectiveness of different teaching methods for children of different age groups will be explored in the section "Effectiveness of different approaches" below.

Figure 14

Number of times each age group was given the different ranks with respect of organisations' priority for interventions (1st rank=highest priority)



275. The type of animals various organisations work with is detailed in Figure 15. A large variety of species are represented, with most types of animals represented equally. When asked to select which group or groups of animals are their priority, 10 organisations answered dogs, 7 answered cats and farm animals (Figure 16). Many of these organisations specialise in only one species or group of animals. The variation in priorities may therefore be due to the type of organisation surveyed.

Figure 15

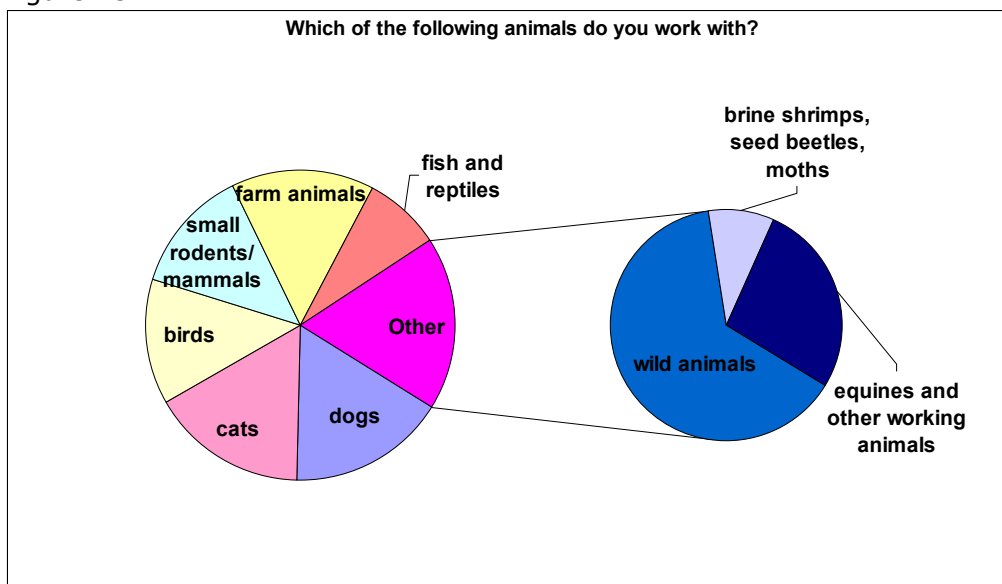
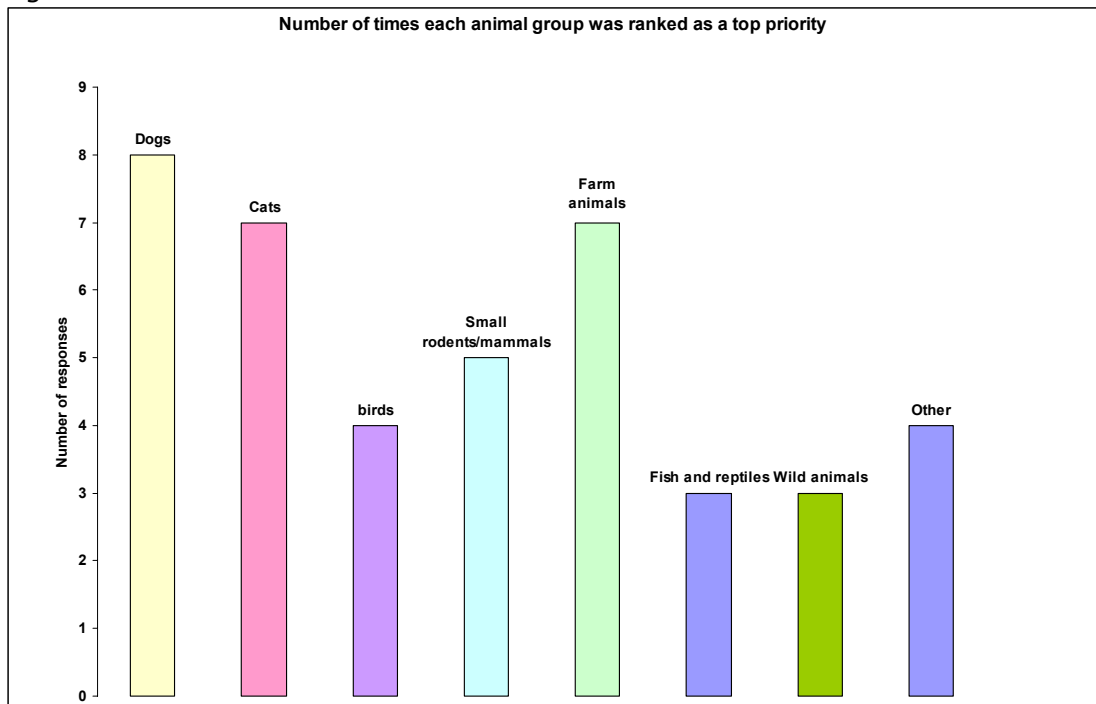


Figure 16



276. The main aims reported by the organisations, in relation to the work carried out with young people, are: preventing animal cruelty, changing attitudes to animals and understanding animal needs (Figure 17). Understanding the animal's needs was ranked as the top priority by most organisations (Figure 18). Other aims listed by the organisations were: encouraging empathy, behaving safely around animals (e.g. around dogs), promoting the 5 animal welfare needs, educating children so that they can make informed choices at the supermarket and buy animal welfare friendly products.

Figure 17

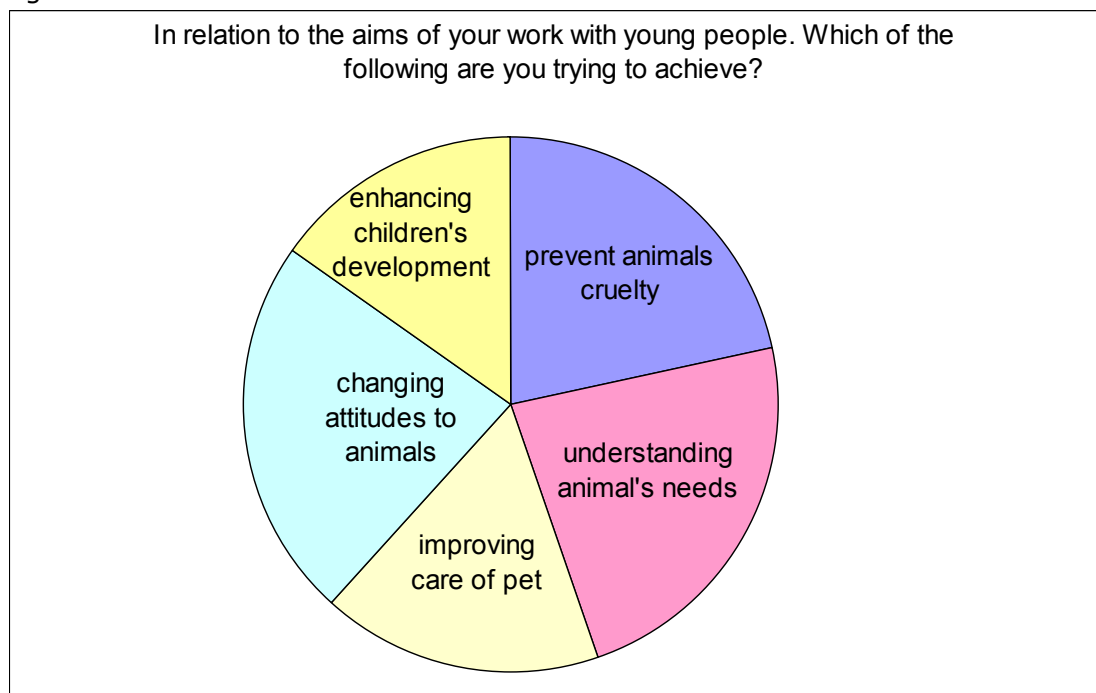
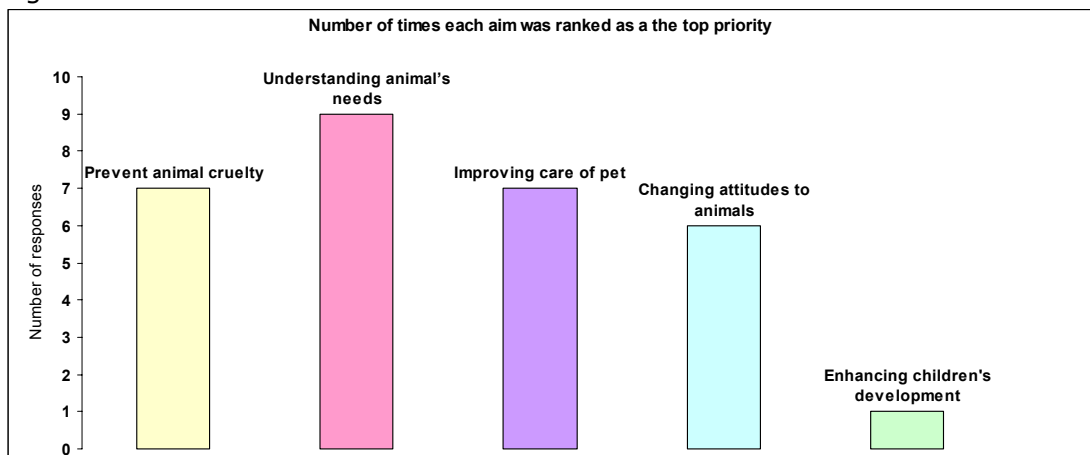


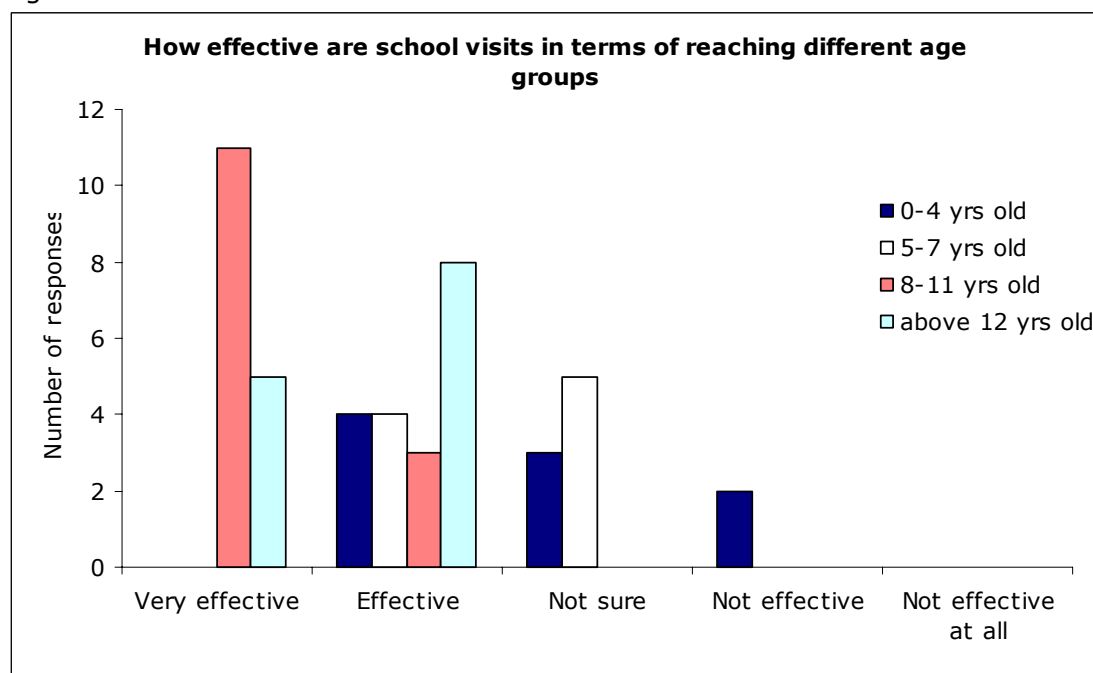
Figure 18



Effectiveness of different approaches

277. The fifth section of the survey "Effectiveness of different approaches" aimed to investigate how the organisations perceived the effectiveness of the approaches they use to promote animal welfare to children and young people.
278. School visits are considered to be very effective for 8-11 year olds, and not effective for 0-4 year olds (Figure 19). Teacher material is also considered very effective in reaching 8-11 year old children (Figure 20). Website material is considered very effective in reaching children above 12-years-old (Figure 21). Working with partners is considered to be effective for 8-11 year old children (Figure 22).
279. Figure 13 above showed that the most targeted age group are 8 to 11-year-olds. The organisations were consistent in their answers, as they reported that most types of activities are most effective for 8 to 11-year-olds compared with other age groups. In fact, school visits are considered to be very effective for 8 to 11-year-olds and not effective for 0 to 4-year-olds (Figure 19).

Figure 19



280. Teacher materials are also considered very effective in reaching 8 to 11-year-olds (Figure 20). Website material is considered very effective in reaching children above 12-years-old (Figure 21).

Figure 20

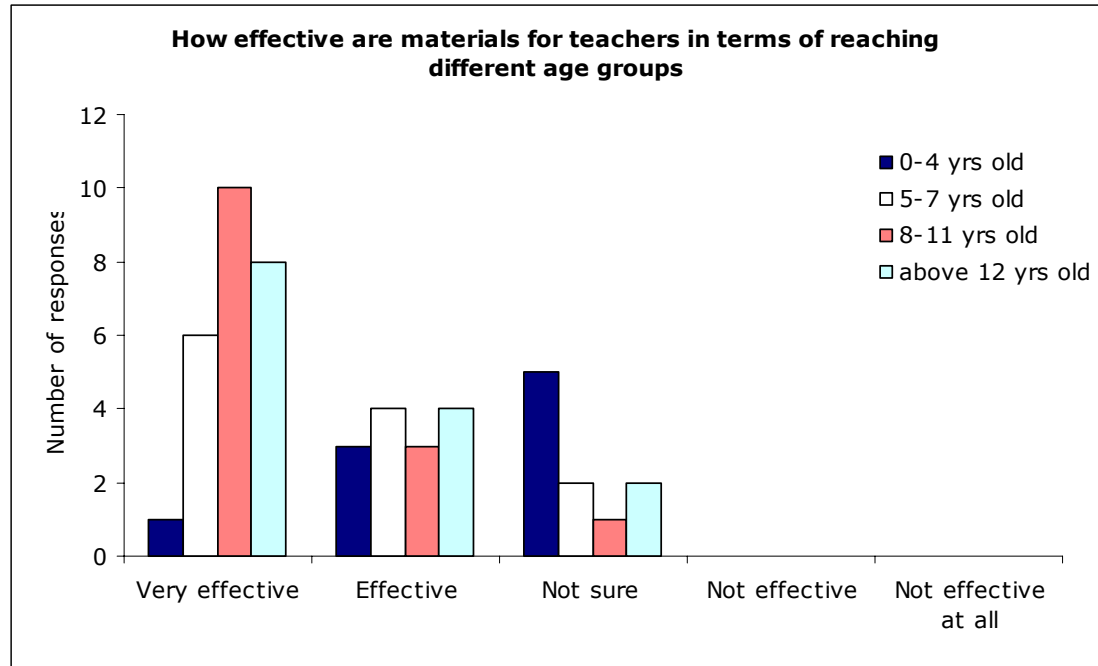
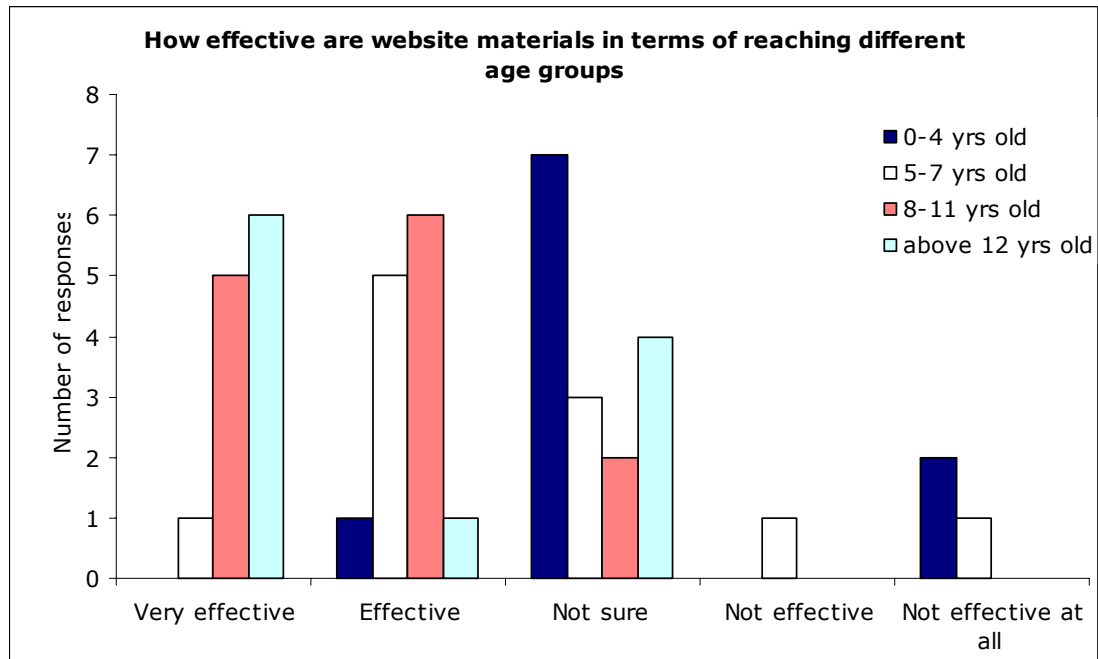


Figure 21



281. Working with partners is considered to be effective for 8 to 11-year-olds (Figure 22). Leaflets are considered effective for children above 12-years-old (Figure 23). A number of organisations also emphasised the importance of having enthusiastic presenters when visiting schools. One also mentioned the importance of the role that school teachers play before and after this type of intervention.

Figure 22

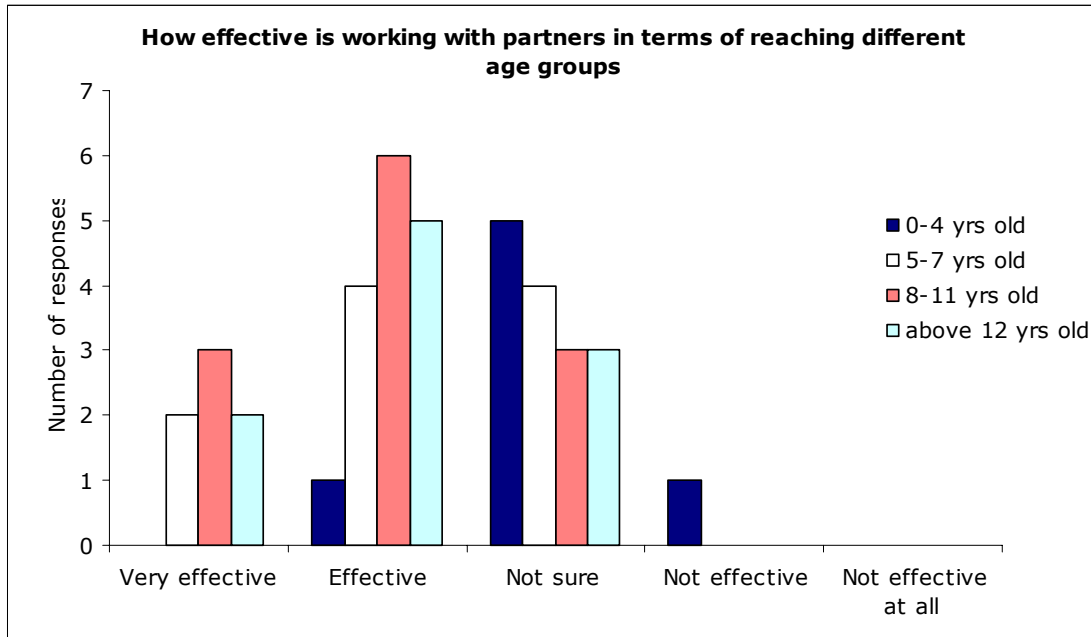
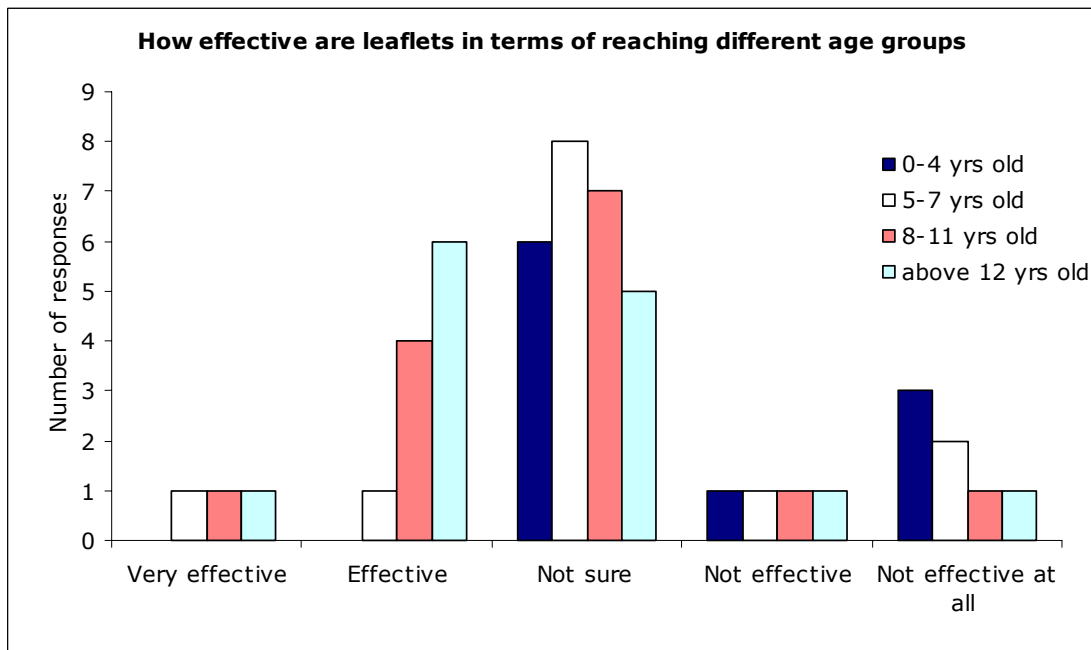


Figure 23



Resource evaluation

282. Section 6 "Resource evaluation" examined which resources had been evaluated internally or externally.
283. Ten out of the 17 organisations who reported having programmes for promoting animal welfare to children and young people said that they had evaluated their resources internally. Four said they had not and three did not reply to this question.
284. The stakeholders were also asked to provide comments on any relevant reports. Most of them reported that the evaluations were done either by informal reports or by requesting feedback from teachers and students.

285. Seven organisations reported having been evaluated by external bodies. When asked to give more details the responses were similar to the question above (i.e., that they received feedback from teachers), suggesting that the question may not have been very clear and that they considered it to be the same question as the one above. It also demonstrates that none of the existing programmes have been methodically evaluated by an external body.
286. The majority of stakeholders (14 out of 17) reported that there is a need for evaluation of resources used to promote animals' welfare to children and young people (three did not reply). When asked to comment on this, most reported that they found it difficult to know how to evaluate such resources. This suggests that it would be beneficial for them to have a University-based team that has the necessary competence to evaluate this type of material.
287. In fact, 11 organisations reported that they would be interested in having their resources evaluated by us, one said that they were not interested and five did not reply. In the next step of this project, these 11 organisations will be contacted and asked if they would be willing to provide the research team with their resources for potential evaluation in terms of promoting animal welfare and DOC for animals to children and young people.
288. The same 11 organisations also said that they would be interested in reviewing their methods on the promotion of animal welfare to children and young people in line with what our research team find. Most organisations therefore seem very interested in improving their methods of promoting animal welfare through University-based research and will therefore be valuable collaborators for future studies as well as the present one.

Summary & implications for interventions to promote a DOC

289. *8 to 11-year-old children are the target for most programmes aiming to promote animal welfare to children. This matches the age group we have identified as being most open to learning about animal needs.*
290. *School visits, providing teacher materials and working with partners (e.g., zoos, veterinary clinics) are considered very effective in reaching 8 to 11-year-old children. Website material and leaflets are considered effective for children above 12-years-old. Very few of these materials are considered by organisations to be effective for children below the age of 8. Within the next phase of the research, these materials will be examined in light of the evidence base reviewed.*
291. *Understanding animals' needs is the top priority in the promotion of animal welfare to children for most organisations.*
292. *Most of the organisations that completed the survey have programmes aimed at promoting animal welfare to children and young people; however none of them have tested their programmes in a scientific and objective way. It appears from their comments that they do not know how to go about evaluating the effects of their interventions and would therefore benefit from having an experienced research team carry out this work for them.*
293. *Most organisations expressed interest in having their resources evaluated by us and said that they would be interested in reviewing their methods in line with what we find.*

PART V: INTEGRATING FINDINGS & ASSESSING IMPLICATIONS

What do our findings mean for the development of interventions to promote a DOC?

Introduction

294. The lack of studies that directly examine children's knowledge, views and behaviour in relation to animal welfare is a significant omission within the literature on child-animal interactions. Most studies focus either on pets and the impact of pet ownership or on attitudes towards animals generally or a specific species (usually as a result of concern in terms of the way the animal is represented). The research on UK-based children and adolescents is particularly limited, yet there is sufficient information available to provide a sound basis for further investigation.
295. Findings from the review on child-animal interactions are often contradictory and this is due to the range of measures employed in different studies and different countries. In a sense, this is required because the place of animals within different cultures and contexts varies so much. However, more robust conclusions will only be possible when standardised measures are consistently and repeatedly used with different age groups across different contexts.
296. In this final section, we use the influential factors discussed within each section of Part II as a means of summarising and drawing together findings to shed light on future directions for future research and intervention work.

Children's direct experience of animals

297. Past and present pet owning is associated with higher levels of animal-oriented empathy, greater interest in animal welfare and greater understanding of animals, biology and animal care (the latter is also the case where children care for animals in school, particularly better species-specific animal care procedures).
298. Our own research revealed no difference in attitudes and empathy between pet owners and non-pet owners, BUT there was a difference in attitudes between those who feel they have an animal of their own and those who do not (regardless of whether or not they had a pet at home). Developing an attachment to an animal is therefore also influential, suggesting a role for interventions that foster empathy. An interesting finding to emerge from the focus groups was that even among pet owners, there is evidence that children are 'mis-reading' or mis-interpreting their animals' behaviour and are uncertain about the details of animal care even in relation to the specific animals they own. Children who show a stronger attachment to their pet and are allowed (by parents) to take responsibility for its care appear to possess more detailed and accurate knowledge about the animal's needs. Educating children about specific animal needs and how to interpret their behaviours is clearly important here; however, the notion of responsibility is also crucial, particularly in terms of the way caring activities are disaggregated within families.

The influence of age (developmental trends)

299. Children naturally develop an understanding of biology from a young age and much of this is relevant to animal welfare. By 4 years, children can distinguish between living and non-living things but have a restricted concept of 'animal' (with mammals being clear examples of animals). From 3, children understand that animals grow bigger with age and by 6, they understand that the amount of food consumed is related to body size, whereas the quality of food is associated with health. Unfortunately,

provision of this knowledge is not always enough to ensure translation into caring behaviours where pets are concerned. For example, children often believe that certain foods are inappropriate or that their animal eats too much, but these beliefs do not always impact on behaviour (perhaps because of the influence of other family members).

300. Children's concepts of biological processes are often inaccurate or partial. Therefore formal teaching is necessary to challenge existing constructs and ensure accuracy. Studies suggest that children are potentially most open to learning about animals' needs and DOC between 7 and 12 years of age. A potential decline in interest in animals with age has been highlighted and, in particular, a shift in interest from physiological needs (increases between 4 and 7, then constant) to a concern with ecological needs (10 to 14) and animal welfare in the sense of cruelty and exploitation (evident with the 11 and 13-year-olds in our research). Children have been described as progressing with age from holding exploitative attitudes towards animals, then emotional and finally ethical concerns. Interventions might usefully alter their focus accordingly in order to capture the interest of different age groups.
301. Qualitative research has revealed a tendency for children to report that their pets have feelings and most talk to them, but from pre-school to 9 years of age, they are not sure if their pets understand them. Older children think pets convey understanding of human verbalisations through physical actions. In our own research, across all ages, children expressed a strong desire to understand their pets better. The wider evidence base suggests that empathy towards humans peaks in the 9-12 age group, but attachment to pets may be strongest in 9 to 10-year-olds. Other studies report attachment gradually decreasing with age; 7 to 8-year-olds often ranking pets higher than other human relationships. Our research showed 9-year-olds held more positive attitudes and higher levels of attachment to pets and human-directed empathy than 11 and 13-year-olds and empathy towards animals decreased gradually between 9 and 13.

Gender differences

302. Gender differences have rarely been a focus in studies of naïve biology knowledge. Girls appear to have higher levels of understanding of inheritance and reproduction than boys (that is likely to be due to play interests and family discourse), while boys appear to know more about wildlife.
303. Although studies of empathy have not shown conclusively that females are more empathic than boys, there are strong theoretical assumptions for believing this to be the case. While studies that have involved observation or parental report find few gender differences in interactions with animals, self-report survey data suggests that females are more empathic towards animals and humans. Girls also tend to be more sympathetic in terms of animal use. Our research confirmed such findings; girls scored higher on affective empathy, including the animal-directed item. Importantly, males have been found to have lower levels of belief in animal mind and may be predisposed to 'systematize', while females are more likely to spontaneously 'empathize'. This suggests a different route to engaging boys and girls is necessary, perhaps focusing on different types of animal and on complementing such predispositions.
304. By contrast, it is widely acknowledged that gender plays a significant role in the formation of attitudes, often shaped by cultural expectations and role models within the family. Girls tend to be more aesthetically and pet-orientated. Boys have more positive attitudes towards wild animals. Our survey with UK children did not reveal gender differences in attitudes or attachment towards pets; therefore the differences may only relate to animals generally. Nonetheless, our focus groups with children highlighted the gendered nature of the caring activities carried out in the home, as well as the impact of parental views and reactions.

Ethnic and cultural influences (media/society)

305. Different cultures represent and use animals in different ways, which necessarily impact on pet ownership, interaction with animals, knowledge, attitudes and empathy. Some cultures tend to view animals more in terms of their economic rather than their emotional value. In other countries, overly emotional responses can result in 'misguided empathy', leading to inadequate or inappropriate care of animals. In Western cultures, there is a huge emphasis on animals in childhood; through stories, TV programmes, films, soft toys and decor. Animals can be misrepresented, which creates idealistic or distorted views of animals and engenders impossible expectations for animals or unnecessary fear in children. Some animals are portrayed as worthy of care and respect, while others are ignored or excluded from moral concern. Educational interventions might usefully highlight some of these negative portrayals, encouraging discussion of underlying reasons and challenging cultural assumptions.
306. While myths are often tenacious and resistant to change by conventional teaching strategies, it appears to be easier to engage with young children to address some of their misconceptions. Adolescents are more influenced by socio-cultural factors and attitudes tend to harden with age. Yet, the post-primary age group may be a particularly important group to target to stimulate change now. If we only engage with younger children, it will take time for improvements in animal welfare to occur.

The influence of geography (urban/rural residence)

307. There is very little research examining the influence of geography of residence on knowledge, attitudes and empathy towards animals. Rural children appear to have a greater understanding of living things and concepts connected to inheritance and genetics than those growing up in urban areas. Yet, children living in urban areas may express greater fondness for animals than rural children. Moreover, while rural children may have greater knowledge, children from urban areas have been found to express more concern about more animal uses than those from rural settings. It is possible that children in rural areas have greater exposure to animals and animal-related discourse that lead them to be more realistic than their urban counterparts. Again, this is an issue that may need to inform intervention work in different locations, though further research is required on its influence.

Intervention development

308. Our review of interventions and research with stakeholders points to a range of pedagogical approaches that could be effective in promoting animal welfare and responsibility to animals in children within the UK. There is need to evaluate these fully in terms of their impact on knowledge, attitudes and empathy both in the short and long-term. The stakeholder survey has shown that:
- (a) there is a great deal of practical activity aimed at promoting animal welfare to children. This activity generally falls within the 'ideal' window that we have identified for knowledge uptake (7 to 12 years of age);
 - (b) the focus on animals' needs may be missing the importance of fostering a degree of empathy/attachment to animals and may not be effective if existing attitudes and behaviour (influenced by the family) are not also acknowledged and addressed;
 - (c) there has been little formal evaluation of the approaches being used by stakeholders, but a general willingness by them to be involved in an evaluation of the most effective routes to promote animal welfare to young people.

Similarly, research in science education and educational psychology suggests that in order for educational approaches to lead to knowledge improvements and behaviour

change they need to lead children to actively re-evaluate their knowledge and construct a more accurate understanding of biology and animals needs. A range of pedagogical approaches can engage this process including peer collaboration and experimentation as well as less interactive methods such as provision of fact sheets and video/DVD-based information. The appropriateness of these methods for different age groups in relation to the promotion of animal welfare should be a priority for future research.

Recommendations for future research

309. The following aspects of child-animal interactions have been identified through the review process as deficiencies in existing research. In Year 1, we have started to address some of these issues and this will be developed in the next two years of the project.
- Children's understanding of animal needs and feelings and their ability to understand differences in needs depending on species.
 - Understanding how well children can interpret animal needs based on the animal's behaviour and demeanour.
 - The influence of the family context on children's experience with, and attitudes towards, animals (including caring activities).
 - The impact of ethnicity and geography of residence on attitudes and empathy.
 - Understanding children's empathy towards animals and the possibility that this generalises to human-directed empathy.
 - Children's cognitive understanding of death in animals, as well as illness symptoms, causation and prevention (only considered in relation to humans).

Key implications for intervention development

310. Any educational interventions need to begin with the children and build from their **existing experiences and interests**. This is necessary to both enhance and challenge their knowledge base and attitudes. There should also be recognition that children will differ in their knowledge, attitudes and empathy towards animals and that some children may have developed fearful emotional reactions and negative attitudes as a result of negative encounters, lack of experience or stories/myths perpetuated in the media.
311. The **age of children** and young people is an important factor to address when developing effective educational interventions. As well as tailoring approaches to the knowledge base and experiences of learners, interventions might usefully capitalise on the changing foci of children and young people's *interests*, providing them with the kind of information they are most eager to learn at different ages.
- (a) Early intervention with pre-school and young children may be necessary to prevent the establishment of unfounded fears and misconceptions about animals and build a strong foundation of knowledge and positive attitudes for later learning.
 - (b) There appears to be strong receptivity to enhancing knowledge about animals within primary-school-age children and even within the early stages of secondary school. Among older children (7 to 12-year-olds), who are already the focus of substantial educational input from key stakeholders, educational programmes may take on the role of being corrective or remedial rather than formative. Early interventions should therefore aim to enhance knowledge of animals and animal care, embrace children's positive attitudes towards animals and enhance a sense of personal agency and responsibility for animal care.

- (c) We have identified in this review that there may be a reduction of general interest in animals during adolescence (beginning around the time children move from primary to secondary school). However, this appears to be accompanied by greater concern about animal cruelty and exploitation. This 'dropping off' point, while challenging, may be a particularly important place to target interventions to promote a DOC. Accordingly, we argue that the focus of educational interventions could shift at this age to concerns about the role of animals in society and ethical issues surrounding animal welfare.
312. Our review also highlights which **important aspects of knowledge, attitudes and empathy** should be included in educational materials and interventions.
- (a) Educating children how to 'read' and correctly interpret animal behaviour appears to be critical, given the false beliefs children can hold and their willingness to 'understand' their animals better. Encouraging children to be able to identify common signals or behavioural cues relating to an animal's welfare should be central to interventions.
 - (b) There is a need to enhance knowledge and understanding among children and young people of the specifics of animal needs and appropriate care practices for a variety of different species of animals.
 - (c) Children should be encouraged to develop positive attitudes to animals and a sense of personal responsibility for animal care. Interventions that engage with children to enhance empathy towards animals are required so that the knowledge children acquire about animal needs is partnered with a sense of responsibility to look after animals at a behavioural level.
 - (d) Direct contact with animals may be particularly important in terms of improving attitudes and empathy, yet there is often reluctance in schools to bring animals in. Interventions need to use a variety of approaches to enhance experience of animals and might usefully include observation of animal behaviour if direct contact is not possible.
 - (e) A range of engaging and interactive materials and pedagogies should be evaluated and refined to maximise the learning outcomes for children and young people of different ages.
313. Animal care happens within **cultural contexts** and interventions need to be designed to foster, build upon, and challenge cultural influences within the UK.
- (a) Family is likely to be the main influence on the development of children's knowledge, attitudes, empathy and ultimately behaviour – particularly the formation of implicit attitudes (through intergenerational transmission). Implicit attitudes are harder to change but crucial. They are difficult to challenge, as we are asking children to question parental behaviour or beliefs. The family is also the context in which children have most direct experience of animals. To maximise effectiveness, any intervention work should include parents as well as children.
 - (b) Gender is a key issue to bear in mind within any intervention to promote a DOC. This particularly pertains to 'caring' activities; certain tasks or behaviours are clearly seen as masculine (more distanced relationship, walking the dog, buying the food, etc.) or feminine (cleaning, cuddling, etc.) and are linked to stereotypically 'male' or 'female' roles. Attention to the particular interests (and predispositions) of boys and girls in relation to animals is also important, as interventions are more effective if they start with, and build on or challenge, existing beliefs and attitudes.
 - (c) Within our focus groups, family contexts and gender concerns were key themes emerging from children's discourse on pet care. These could inhibit, or act as

barriers, to children looking after animals. Interventions should therefore focus on identifying, examining and eliminating perceived barriers to animal care within the family context.

314. Finally, we suggest that 'care' may not be the best way to think about DOC promotion. We might instead focus on promoting '**nurturance**' as described by Melson (1990). We believe that nurturance involves a range of behaviours beyond simply 'care-giving' which implies a focus only on animals' basic physiological needs. Promoting nurturance towards animals among children would involve attention to three broad dimensions, as we have suggested throughout the report:

- Emotion (children's affect, feelings and emotional investment in animals).
- Behaviour (what skills children have in nurturing others and applying those skills, that is, the child's responsiveness or ability to 'read' nonverbal cues to assess need and select behaviours that will meet that need).
- Cognition (ideas and knowledge that children have about the object of nurturance, its needs and how to meet them).

ACKNOWLEDGEMENTS

We would like to thank a number of people for their role in the production of this report:

- The schools that permitted us to visit and speak with the children and young people.
- The children and young people who participated in the pupil survey and/or focus groups.
- The stakeholders who participated in the on-line survey and showed such interest in the outcomes of our research.
- Jo Stilwell at the Moray House School of Education for transcribing the focus groups.
- Emily Healy and Jehane Barbour at the Child and Adolescent Health Research Unit (CAHRU) for their administrative support and assistance in website development, survey design, proofreading and data entry/checking.

APPENDICES

Appendix 1: The benefits of interactions with animals

Appendix 2: Key points from the field of animal cruelty in childhood

Appendix 3: The stakeholder survey (administered on-line)

Appendix 4: The pupil survey (administered in schools)

Appendix 5: The protocol for the administration of the pupil survey and focus groups

APPENDIX 1

The benefits of interactions with animals

315. A popular area of research on human-animal interactions has examined the effects of pet ownership or interaction with animals on humans (particularly their health and well-being). The focus here has been on specific groups (e.g., the elderly, disabled children) or therapeutic settings (McNicholas & Collis, 2000). The latter (the use of animals in therapeutic settings) is a significant field of research in itself. Therefore, we have been unable to include this area within our review. Here, we highlight some of the key points raised in the literature on benefits, which we will explore further as the project progresses.
316. Much of the research on benefits has concentrated on adults and there is mounting evidence that pets do have health benefits of a therapeutic, psychological, physiological and psychosocial nature (McNicholas, Gilbey, Rennie, Ahmedzai, Dono & Ormerod, 2005). Pet-facilitated therapy has been shown to be effective in a range of settings with different sub-sets of the population, but particularly in terms of enhancing mental health (stress, depression, loneliness, bereavement and social isolation).
317. McNicholas et al. (2005) argue that while benefits to human health have been found (higher survival rates from myocardial infarction, lower use of general practitioner services, reduced risk of asthma and allergic rhinitis in children exposed to pet allergens, and reduced risk of cardiovascular disease), recent studies have failed to replicate these results. However, they argue that pet ownership is likely to be important in terms of outcomes that are not as easily measurable, such as quality of life or a sense of social integration.
318. Pet ownership has indeed been linked to social protective factors in adults (in terms of social support, self-care, self-esteem and community integration) and it has been argued that social relationships (or lack of them) constitute a major risk factor for health (House, Landis & Umberson, 1988). Relationships with pets may mirror aspects of human relationships or, alternatively, provide a different form of support or companionship.
319. Pets are increasingly being viewed as an important source of comfort in modern society, with increasing violence, a greater proportion of people living alone and a fast-paced changing world. In Western culture, where overt displays of affection are generally inappropriate, petting animals may offer an emotional outlet that is culturally acceptable at any stage in life (Morrow, 1998).
320. Owning a dog in particular is linked to positive health gains and higher levels of physical activity compared with non-dog owners. It has also been suggested that pets (particularly dogs) function as a social lubricant or 'conduits of social capital', increasing or strengthening social networks and fostering greater trust and reciprocity (Wood, Giles-Corti & Bulsara, 2005).
321. As far as children are concerned, pets may act as 'transitional objects' and a bridge between their bond with the primary caregiver and the wider peer group (Melson, 1990). The use of animals as catalysts for emotionally-disturbed children originated with Levinson (1969) who saw short-term interaction as an 'emotional bridge' into other relationships (Serpell, 1999). Intimacy with pets in response to stressful events is also associated with transient improvements in social-emotional functioning (Bryant, 1990). Therefore, their role as temporary emotional refuge is worthy of further investigation (Serpell, 1999).

APPENDIX 2

Key points from the field of animal cruelty in childhood

322. It has been suggested that allowing children to be cruel to animals desensitizes them to suffering or gives them an opportunity to experience and get a taste for the thrill of inflicting pain; 'the graduation hypothesis' (Arluke & Lockwood, 1997). This concept is still implicit in literature on the link between animal abuse and family violence (Serpell, 1999), where there are concerns about intergenerational continuity of attitudes and behaviours as a result of parental modelling.
323. Exposure to animal cruelty in childhood may cause children to become less empathic and therefore less inhibited about showing violence toward family members (Flynn, 1999). Some children may be born with an 'empathy deficit' that predisposes them to violence and abuse.
324. Solitary perpetration of animal abuse may represent more significant pathology (Hensley & Tallichet, 2005), than cruel acts committed with other people that may constitute a form of 'dirty play' (Arluke, 2002); socialisation (temporary and more related to fitting in with peers/establishing an identity rather than pathology). This appears to be more common in boys, thus highlighting the need to address the notion of animal welfare within a peer and gendered culture as well as the wider cultural context.
325. The relationship between fear of animals and animal cruelty is a potential area for future research, as there is a significant correlation between abuse and fear (Pagani, Robustelli & Ascione, 2007). Feelings while committing animal abuse are also important; what motivates such behaviour.
326. Perpetrated (as well as witnessed) animal abuse has been found to increase with age but only up to age 13-14 (Pagani, Robustelli & Ascione, 2007). In this Italian study, exposure to animal abuse was frequent enough for the authors to describe it as 'normative'. They highlighted the issue of wider cultural social acceptance or rejection of animal cruelty: *'Our results indicate that only about two thirds of parents disapproved of their children's cruel behaviour and that peers very often tended to approve or, in any case, to tolerate young perpetrators' behaviour. The latter fact should especially be of concern to families and teachers'* (Pagani, Robustelli & Ascione, 2007: p. 289). They argue that child-animal relationships must be examined in their cultural context, particularly in relation to differences in definitions of socially acceptable versus socially unacceptable forms of animal cruelty. According to Flynn (2001), a high level of socially acceptable violence to animals contributes to increasing unacceptable violence. Children and young people's definitions of what constitutes 'cruelty' may be an important issue to address in future research.

APPENDIX 3

The stakeholder survey (administered on-line)

Questionnaire on Activities Aimed at Promoting Animal Welfare to Young People

Introduction to the project:

Promoting a 'Duty of Care' towards animals among young people' is a collaborative project between the University of Edinburgh and SAC (The Scottish Agricultural College) and is funded by Defra (Department for Environment, Food and Rural Affairs). You can learn more about the overall aims of the project by referring to Appendix A of this document or by going to our web-site

<http://www.education.ed.ac.uk/cahru/research/dutyofcare.php>

Our main aim is to develop a scientific understanding of how to promote animal welfare to young people, as a basis for developing and evaluating evidence based interventions aimed at increasing knowledge and developing positive attitudes towards animals among young people.

As a part of our project we wish to understand better the existing remit, role and activities of various organisations involved in promoting animal welfare to young people. This questionnaire has been designed with that aim in mind and we would be very grateful if you would take the time to provide us with the requested information.

If you wish to query any of the points or require further information, please contact Alistair Lawrence (alistair.lawrence@sac.ac.uk, 0131 535 3217/ 3046).

Many thanks for your help.

Section 1: History of working with children / young people

1. Please provide the name and contact details of your organisation.
 2. What is your role in the organisation?
 3. Is your organisation involved in promoting animal welfare to children and young people?
Yes No
 4. Have you been involved in promoting animal welfare to young children?
Yes No
 5. Please provide a general statement of your organisation's aims/vision with respect to promoting animal welfare to young people.
-

Section 2: Promoting animal welfare to children

6. Do you produce materials for teachers to use?
Yes No
7. Have they been specifically designed/ developed for school use?
Yes No
8. Please specify what kind of materials you have developed for teachers
9. Do you work with youth organisations
Yes No

10. Please give further details
11. Do you work with veterinary clinics?
Yes No
12. Please give further details.
13. Do you produce web-site materials for children/young people?
Yes No
14. If yes please explain what type of website material you have developed to target children and young people and if possible, provide URL
15. Does your organisation use any other strategies/activities to promote animal welfare to children and young people?
16. Do you visit schools?
Yes No
17. If yes, please specify the scale of your school work.
- a. numbers of staff involved: -----
b. numbers of schools visited within the past 12 months:-----
18. With the pupils do you:
- | | | |
|------------------------|-----|----|
| a. Run discussions? | Yes | No |
| b. Give talks? | Yes | No |
| c. Run demonstrations? | Yes | No |
19. Do you produce materials to use in your visits to schools?
Yes No
20. Please tell us more about these materials if they are different from those discussed in the last section.
21. Were these designed/developed specifically for use in schools?
Yes No
22. Do you take animals into schools?
Yes No
23. What type of animals?
- | | |
|---|--|
| <input type="checkbox"/> Cats | <input type="checkbox"/> Birds |
| <input type="checkbox"/> Dogs | <input type="checkbox"/> Fish and/or Reptiles |
| <input type="checkbox"/> Small rodents / mammals | <input type="checkbox"/> Insects / Other invertebrates |
| <input type="checkbox"/> Other animals, please specify: _____ | |
-

Section 4: Specific targets

24. Please specify which age groups you target

☐ 0-4 years old ☐ 5-7 years old ☐ 8-11 years old ☐ 12 + years old

25. Can you give a rank order with respect to priority for interventions? You do not need to rank those that are not in your target and you can apply the same rank to more than one.

Insert rank in box: 1= top priority, 4= lowest priority

☐ 0-4 years old ☐ 5-7 years old ☐ 8-11 years old ☐ 12 + years old

26. Which of the following categories of animal do you work with?

<input type="checkbox"/> dogs	<input type="checkbox"/> cats
<input type="checkbox"/> birds	<input type="checkbox"/> fish & reptiles
<input type="checkbox"/> farm animals	<input type="checkbox"/> small rodents/mammals
<input type="checkbox"/> other	<input type="checkbox"/> wild animals

27. Which animals are your priority? Please rank those below. You do not need to rank those you do not work with and you can apply the same rank to more than one. 1= top priority, 8= lowest priority

<input type="checkbox"/> dogs	<input type="checkbox"/> cats
<input type="checkbox"/> birds	<input type="checkbox"/> fish & reptiles
<input type="checkbox"/> farm animals	<input type="checkbox"/> small rodents/mammals
<input type="checkbox"/> other	<input type="checkbox"/> wild animals

28. In relation to the aims of your work with young people. Which of the following are you trying to achieve?

☐ preventing animal cruelty
☐ understanding animals' needs
☐ improving care of pet
☐ changing attitudes and behaviour to animals in general
☐ enhancing young peoples' development

29. Can you give a rank these aims in terms of their relative importance? . You do not need to rank those you do not work with and you can apply the same rank to more than one. 1= top priority, 5= lowest priority

☐ preventing animal cruelty
☐ understanding animals' needs
☐ improving care of pet
☐ changing attitudes and behaviour to animals in general
☐ enhancing young peoples' development

30. If you have other aims not listed please specify (and rank if possible from the most important to the least important)

Section 5: Effectiveness of different approaches

31. How effective are school visits for different age groups?

0-4 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

5-7 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

8-11 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

12+ years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

32. How effective are materials for teachers in terms of reaching different age groups?

0-4 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

5-7 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

8-11 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

12+ years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

33. How effective are website materials for different age groups?

0-4 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

5-7 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

8-11 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

12+ years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

34. How effective is working with partners (e.g zoos; veterinary clinics) in terms of reaching different age groups?

0-4 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

5-7 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

8-11 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

12+ years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

35. How effective are leaflets in terms of reaching different age groups?

0-4 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

5-7 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

8-11 years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

12+ years old

- ☐ not applicable
☐ not effective at all
☐ not effective
☐ not sure
☐ effective
☐ very effective

36. Please use the box below for comments. You may have found it hard to assign a score above, for example, or you may use approaches that we have not mentioned that are effective.

37. Please explain why the approaches/activities you have ranked highest work so well.

Section 6: Resources evaluation

38. Have you internally evaluated any of your resources/ approaches internally?
Yes No
39. If so please use the space to provide comments and reference to any relevant reports
40. Have any of your resources/ approaches been evaluated for their effectiveness by an external body?
Yes No
41. If so please use the space to provide comments and reference to any relevant reports
42. Do you feel there is a need for evaluation of approaches used to promote animal welfare to young people?
Yes No
43. Please use the box below to comment (e.g. on limitations to evaluations)
44. We will be developing resources/interventions based on the evidence we collect. Would you be interested in having any of your resources evaluated by us?
Yes No
45. Would you be interested in reviewing your methods on the promotion of animal welfare to children/young people in line with what we find?
Yes No
46. What other organisations would you recommend us contacting?
47. We are planning to carry out a small number of follow-up interviews after the survey data has been analysed. These may be by telephone or in person. Please can you indicate below, whether or not you would be willing to be interviewed?
Yes No
48. We would be grateful if you could supply a contact telephone number, address or e-mail so that we can reach you easily.
-

Thank you for taking the time to answer these questions.

Contacts

Professor Alistair Lawrence (Head of Animal Welfare, SAC)
Dr Janine Muldoon (CAHRU Research Fellow)
Dr Jo Williams (Lecturer, Moray House School of Education)
Dr Nelly Lakestani (Researcher, SAC)
Professor Candace Currie (CAHRU Director/HBSC International Coordinator)

The pupil survey (administered in schools)



Children and young people’s views of animals and pets

- ★ This survey will help us understand how important animals are in young people’s lives.
- ★ If you do not want to answer a particular question, you do not have to. Please put an * next to it to help us.
- ★ You do not need to put your name on this survey. Your answers will be kept private.

Pupil ID	
School ID	

To begin, we would like to ask a few questions about you.

1. Are you a boy or a girl?

☐ 1 Boy

☐ 2 Girl

2. How old are you? *Please tick one circle*

☐ 1 9

☐ 2 10

☐ 3 11

☐ 4 12

☐ 5 13

☐ 6 14

3. What is your date of birth?

The next few questions ask about your family and your home, so that we can compare groups of people living in similar and different situations.

4. Does your family own a car, van or truck?

☐ 1 No

☐ 2 Yes, one

☐ 3 Yes, two or more

5. Do you have your own bedroom for yourself?

1 ☐ No

2 ☐ Yes

6. How many computers does your family own?

1 ☐ None

2 ☐ One

3 ☐ Two

4 ☐ More than two

7. During the past 12 months, how many times did you travel away on holiday with your family?

1 ☐ Not at all

2 ☐ Once

3 ☐ Twice

4 ☐ More than twice

Now we would like to ask you some questions about any pets you have (or have had in the past).

8. How many pet animals live in your home at the moment? *Please tick one circle*

1 ☐ None

2 ☐ One

3 ☐ Two

4 ☐ More than two

The next set of questions asks how you feel about pets and animals in general. Please read each question carefully and answer as honestly as you can. No one will see your answers.

13. What do you think of pets and other animal(s)? *Please tick one circle for each line to tell us how much you agree or disagree*

	(1) Strongly agree	(2) Agree	(3) Not sure	(4) Disagree	(5) Strongly disagree
I really like seeing pets enjoy their food	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pets add happiness to my life (or would if I had one)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spend time every day playing with my pet (or would if I had one)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have sometimes talked to my pet and understood what it was trying to tell me (or would if I had one)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to feed animals out of my hand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I love pets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I frequently talk to my pet (or would if I had one)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hate animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please only answer the next questions if you have a pet animal.
Skip to section 16 if you do not have a pet.

14. Please tell us how you feel about your favourite pet animal. *Please tick one circle for each line to tell us how much you agree or disagree.*

	(1) Strongly agree	(2) Agree	(3) Not sure	(4) Disagree	(5) Strongly disagree
I meet new people because of my pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet is more bother than it is worth	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet helps me get through tough times	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I did not have a pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There are times I'd be lonely without my pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet gives me a reason for getting up in the morning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet knows when I'm upset and tries to comfort me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet helps me to be more physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel committed and responsible for the care of my pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I miss my pet when I am away from home	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not intend to get another pet in the future	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. Here are a few more questions about how you feel about your favourite pet animal. *Please tick one circle for each line to tell us how much you agree or disagree.*

	(1) Strongly agree	(2) Agree	(3) Not sure	(4) Disagree	(5) Strongly disagree
My pet is like a member of the family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet knows when I'm feeling bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I often talk to other people about my pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet understands me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that loving my pet helps me stay healthy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet and I have a very close relationship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I play with my pet quite often	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider my pet to be a great companion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My pet makes me feel happy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am not very attached to my pet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Owning a pet adds to my happiness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider my pet to be a friend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The next few questions ask how you feel in different situations. Remember noone will see your answers. Please answer as honestly as you can.

16. How do you feel in these situations? *Please tick one circle for each line to tell us how much you agree or disagree.*

	(1) Strongly agree	(2) Agree	(3) Not sure	(4) Disagree	(5) Strongly disagree
It makes me sad to see a child who can't find anyone to play with	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Seeing a child who is crying makes me feel like crying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sometimes I cry when I watch TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get upset when I see a child being hurt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some songs make me so sad I feel like crying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I see someone suffering, I feel bad too	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I walk by a needy person I feel like giving them something	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It upsets me when another child is being shouted at	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When my parents get upset I feel bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get upset when I see an animal being hurt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Last question!!!

17. Do you have a favourite animal?

- 1 ☐ Yes What is it? _____
- 2 ☐ No - I like all/most animals
- 3 ☐ No - I don't like animals

Thank you for helping us with these questions.

If you would like to tell us anything else about our questionnaire or your feelings about animals or pets, please write in the box below.

APPENDIX 5

The protocol for the administration of the pupil survey and focus groups

Promoting a Duty of Care towards animals Protocol for fieldwork with children

Survey with whole class

Introductions/anonymity of survey (those participating in the focus groups should not complete the survey, so focus groups need to be carried out before the survey OR volunteers for focus groups asked not to complete survey)

Survey completion (PAS):

- Ask children to raise hand if they do not understand a question
- Keep a record of all queries, encouraging children to think about what question means and taking note of their responses
- Ask children if we should ask any other questions

Thank children for their help

Focus groups with 4 pupils per group

Introductions: filling out name tags

Discuss consent, answer questions and complete forms

Explain use of digital recorder, not talking over each other

PART 1: ATTITUDES TO ANIMALS

First of all, we are going to start with a quick activity, where we want you to work on your own and then we'll share our ideas.

Activity Sheet 1: 'Animals I like' (my top five best animals)

- Children complete on their own
- First they list their top five
- The researcher lists them on a flipchart sheet as children shout out
- Ask children to explain why they have chosen those animals
- Follow-up children's comments (issues to seek clarification on: fear of animals, specific animal behaviour/characteristics, where perceptions come from, who/what are key influences).
- **Important questions:**
 - (1) How do you know...? [i.e., how an attitude developed, who influenced them (media, parents, experience)]
 - (2) Why do you feel...? (e.g., happy around dogs/scared of spiders?)
 - (3) Who told you...?

Activity Sheet 2: 'Animals I don't like' (my top five worst animals)

- Repeat as above

- To address attitudes of farm animals: Now, nobody (or say how many) has/have chosen a farm animal have they as an animal they like or dislike - why is that?

Ok, we're going to think now about particular kinds of animals, those that we can keep as pets in the family home.

Activity Sheet 3: 'Animals as family pets' (think of five pets)

- Children complete sheet on their own
- Then share ideas (expecting similarities)

PART 2: UNDERSTANDING OF ANIMAL CARE

Vignettes: Animal needs

Whether or not we like pet animals, they do need certain things don't they? So let's first look at Pops. This is Pops the cat who lives with the Johnson family.

- (1) What kind of food do you think 'Pops' needs?
 - (2) How often does 'Pops' need to be fed?
 - (3) What else does 'Pops' need to keep well?
 - Ask children to explain if unclear and notice where children apply caveats
- Repeat with other three animals

Ok, it would be useful for us to know who has pets in their home, so can you fill this form out for us?

Activity Sheet 4: 'My pets'

- Children complete form
- Researcher confirms who has what kind of animal

Questions on identifying animal needs:

- (1) How can you tell when your animal needs something?
- (2) Do you think animals have feelings?
 - Do all animals have feelings?
 - If an animal doesn't have feelings, should we treat it differently than animals that do have feelings?
- (3) How can you tell when your animal is distressed?
 - Can you always tell why your animal is distressed?
 - Can you give any examples of things you have done when your animal has been distressed?

Questions on animal care/responsibility:

- (4) Ok, so who looks after that/those animal(s)?
 - For those who haven't got an animal at home, who do you think would look after them if you did?
- (5) How do they look after them?
 - Note which activities children say they do (for next question)

(6) So, some of you look after your pets by ... (repeat examples they gave). Are there any other things you do to take care of them?

- How do you know how to care for them properly?
- Where do you get information from?

(7) Are there any things you would like to do for your animal but you can't? (Factors inhibiting duty of care)

PART 3: AWARENESS OF DUTY OF CARE

Activity Sheet 5: Pets in the family (Who usually looks after family pets?)

Concept of responsibility, DOC)

- Children complete form
- Share ideas and prompt children to think about the reasons why particular people do most of the caring for pets

Activity Sheet 6: Pets in the family (Who should look after family pets?) (Concept of responsibility, DOC)

- Children complete form
- Share ideas and probe children's reasoning for their choice
- Inform children that by law people who own pets are now responsible for making sure that animals are cared for and treated properly. Did you know that?
- Note children's response and gauge how they know (not expecting younger children to know)

REFERENCES

Websites

Animal Welfare Act (2006). Office of Public Sector Information

http://www.opsi.gov.uk/acts/acts2006/ukpga_20060045_en_1

Department for Environment, Food and Rural Affairs (Defra). (2006). Animal Welfare Laws: it's your duty to care. <http://www.defra.gov.uk/animalh/welfare/act/pdf/dutytocare.pdf>

Farm Animal Welfare Council (FAWC). (2009). Five Freedoms.

<http://www.fawc.org.uk/freedoms.htm>

Pet Food Manufacturers Association (pfma). (2009). Pet Statistics.

<http://www.pfma.org.uk/statistics/pet-statistics.htm>

Journal articles and books

Al-Fayez, G., Awadalla, A., Templer, D. I. & Arikawa, H. (2003). Companion animal attitude and its family pattern in Kuwait. *Society & Animals*, 11(1), 17-28.

Altman, J. D. (1998). Animal activity and visitor learning at the zoo. *Anthrozoös*, 11(1), 12-21.

Anderson, M. V. & Henderson, A. J. Z. (2005). Pernicious portrayals: The impact of children's attachment to animals of fiction on animals of fact. *Society & Animals*, 13(4), 297-314.

Aria, T., Uno, S., Kudo, Y. & Shirai, H. (2001). Teaching by using boundary instances: Modifying undergeneralized misconceptions in elementary school children's conceptual learning about animals. *Japanese Journal of Educational Psychology*, 49(2), 230-239.

Arluke, A. (1988). "Sacrificial symbolism in animal experimentation: object or pet?" *Anthrozoös*, 4, 88-112.

Arluke, A. (2002). Animal abuse as dirty play. *Symbolic Interaction*, 25(4), 405-430.

Arluke, A. (2003). Childhood origins of supernurturance: The social context of early humane behavior. *Anthrozoös*, 16(1), 3-27.

Arluke, A. & Lockwood, R. (1997). Guest editors' introduction: Understanding cruelty to animals. *Society & Animals*, 5(3), 183-193.

Ascione, F., Thompson, T. & Black, T. (1997). Childhood cruelty to animals: Assessing cruelty dimensions and motivations. *Anthrozoös*, 10 (4), 170-182.

Ascione, F. R. (1992). Enhancing children's attitudes about the humane treatment of animals: Generalization to human-directed empathy. *Anthrozoös*, 5, 176-191.

Ascione, F. R. (1997). Humane education research: Evaluating efforts to encourage children's kindness and caring toward animals. *Genetic Social and General Psychology Monographs*, 123(1), 59-77.

Ascione, F. R., Latham, G. I. & Worthen, B. R. (1985). *Final Report Year 2: An Experimental Study. Evaluation of the Humane Education Curriculum Guides*. Report to the National Association for the Advancement of Humane Education.

Ascione, F. R. & Weber, C. V. (1996). Children's attitudes about the humane treatment of animals and empathy: one-year follow up of a school-based intervention. *Anthrozoös*, 9(4), 188-195.

Askew, C. & Field, A. P. (2007). Vicarious learning and the development of fears in childhood. *Behaviour Research and Therapy*, 45(11), 2616-2627.

Backscheider, A. G., Shatz, M. & Gelman, S. A. (1993). Preschoolers' ability to distinguish living kinds as a function of regrowth. *Child Development*, 64(4), 1242-1257.

Badaracco, R. J. (1973). Scorpions, squirrels or sunflowers? *American Biology Teacher*, 35(9), 528-538.

- Banaji, M. R. (2001). Implicit attitudes can be measured. In H. L. Roediger, J. S. Nairne & A. Surprenant (Eds.), *Nature of Remembering - Essays in Honor of Robert G. Crowder* (pp. 117-150). Washington DC: American Psychological Association.
- Barker, S. B. & Barker, R. T. (1988). The human-canine bond: Closer than family ties? *Journal of Mental Health Counseling*, 10, 46-56.
- Baron-Cohen, S. (2003). *The Essential Difference: Men, Women and the Extreme Male Brain*. London: Penguin Books.
- Beck, A. M. & Katcher, A. H. (1983). *Between Pets and People: The Importance of Animal Companionship*. New York: G P Putnam's Sons.
- Bell, B. F. (1981). When is an animal not an animal? *Journal of Biological Education*, 15(3), 213-218.
- Bibace, R. & Walsh, M. E. (1980). Development of children's concepts of illness. *Pediatrics*, 66(6), 912-917.
- Bixler, R. D., Carlisle, C. L., Hammitt, W. E. & Floyd, M. F. (1994). Observed fears and discomforts among urban students on field trips to wildland areas. *Journal of Environmental Education*, 26(1), 24-33.
- Bjerke, T., Kaltenborn, B. P. & Odegardstuen, T. S. (2001). Animal-related activities and appreciation of animals among children and adolescents. *Anthrozoös*, 14(2), 86-94.
- Bjerke, T., Odegardstuen, T. S. & Kaltenborn, B. P. (1998). Attitudes toward animals among Norwegian adolescents. *Anthrozoös*, 11, 79-86.
- Bloch, M. E. F., Solomon, G. E. A. & Carey, S. (2001). An understanding of what is passed on from parents to children: a cross-cultural investigation. *Journal of Cognition and Culture*, 1, 43-68.
- Boat, B. W. (1994). *Boat Inventory on Animal-Related Experiences*. Cincinnati: University of Cincinnati.
- Borke, H. (1971). Interpersonal perception of young children: Egocentrism or empathy? *Developmental Psychology*, 11, 240-243.
- Bowd, A. D. (1984). Fears and understanding of animals in middle childhood. *Journal of Genetic Psychology*, 145, 143-144.
- Bowd, A. D. (1989). The educational dilemma. In D. Paterson & M. Palmer (Eds.), *The Status of Animals: Ethics, Education and Welfare* (pp. 52-57). Wallington, Oxon: CAB International.
- Bowlby, J. (1969). *Attachment and Loss: Vol 1 Attachment*. New York: Basic Books.
- Bruce, B. & McGrath, P. (2005). Group interventions for the prevention of injuries in young children: A systematic review. *Injury Prevention*, 11, 143-147.
- Bryant, B. K. (1982). An Index of Empathy for Children and Adolescents. *Child Development*, 53(2), 413-425.
- Bryant, B. K. (1990). The richness of the child-pet relationship: a consideration of both benefits and costs of pets to children. *Anthrozoös*, 3, 253-261.
- Cameron, R. K. K. (1983). *The Effects of Two Instructional Treatments on Eighth-Grade Students' Attitudes Toward Animal Life*. Unpublished doctoral dissertation, Purdue University.
- Carey, S. (1985). *Conceptual Change in Childhood*. Cambridge, MA: MIT Press.
- Chapman, S., Cornwall, J., Righetti, J. & Sung, L. (2000). Preventing dog bites in children: randomized controlled trial of an educational intervention. *Western Journal of Medicine*, 173(4), 233-234.
- Chawla, L. (1988). Children's concern for the natural environment. *Children's Environments Quarterly*, 5(3), 13-20.
- Cohen, S. & Horm-Wingerd, D. (1993). Children and the environment: Ecological awareness among preschool children. *Environment and Behavior*, 25(1), 103-120.
- Coleman, G. J., Hall, M. J. & Hay, M. (2008). An evaluation of a pet ownership education program for school children. *Anthrozoös*, 21, 271-284.
- Coley, J. D. (2009, June 3-5). *Folk biological induction: environmental and developmental differences in the use of taxonomic and ecological knowledge*. Paper presented at the

- Biological understanding and Theory of Mind: Core Knowledge and Naïve Conceptions in Children and Adults, International Conference, Reims, France.
- Coley, J. D., Solomon, G. E. A. & Shafto, P. (2002). The development of folkbiology: A cognitive science perspective on children's understanding of the biological world. In P. Kahn & S. Kellert (Eds.), *Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations* (pp. 65-91). Cambridge, MA: MIT Press.
- Currie, C., Molcho, M., Boyce, B., Holstein, B., Torsheim, T. & Richter, M. (2008). Researching health inequalities in adolescents: The development of the Health Behaviour in School-Aged Children (HBSC) Family Affluence Scale. *Social Science and Medicine*, 66(6), 1429-1436.
- Daly, B. & Morton, L. L. (2003). Children with pets do not show higher empathy: A challenge to current views. *Anthrozoös*, 16(4), 298-314.
- Daly, B. & Morton, L. L. (2006). An investigation of human-animal interactions and empathy as related to pet preference, ownership, attachment, and attitudes in children. *Anthrozoös*, 19(2), 113-127.
- Davis, J. H. & Juhasz, A. M. (1995). The preadolescent pet friendship bond. *Anthrozoös*, 8, 78-82.
- Davis, M. H. (1983). Measuring individual differences in empathy: evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113-126.
- De Jong, P. J., Andrea, H. & Muris, P. (1997). Spider phobia in children: disgust and fear before and after treatment *Behaviour Research and Therapy*, 35, 559-562.
- DeRosa, B. (1984). Differences between boys' and girls' attitudes toward animals. *Humane Education*, from http://humanesocietyyouth.org/research_evaluation/PDF/Differences.pdf
- Drews, C. (2002). Attitudes, knowledge and wild animals as pets in Costa Rica. *Anthrozoös*, 15(2), 119-138.
- Driscoll, J. W. (1992). Attitudes toward animal use. *Anthrozoös*, 5(1), 32-39.
- Driver, R., Asoko, H., Scott, P. & Mortimer, E. (1994). Constructing scientific knowledge in the classroom. *Educational Researcher*, 23(7), 5-12.
- Eagly, A. H. & Chaiken, S. (1993). *The Psychology of Attitudes*. London: Harcourt Brace Jovanovich.
- Eisenberg, N. (1982). *The Development of Prosocial Behavior*. New York: Academic Press.
- Enz, S., Zoll, C. & Watson, S. (in prep). The Empathy Questionnaire.
- Finch, P. (1989). Learning from the past. In D. Paterson & M. Palmer (Eds.), *The Status of Animals: Ethics, Education and Welfare* (pp. 64-72). Wallington, Oxon: CAB International.
- Fitzgerald, T. A. (1981). Evaluating humane education: the Jefferson County study. *Humane Education*, 5, 21-22.
- Flynn, C. P. (1999). Animal abuse in childhood and later support for interpersonal violence in families. *Society & Animals*, 7(2), 161-172.
- Flynn, C. P. (2001). Acknowledging the "zoological connection": A sociological analysis of animal cruelty - commentary. *Society & Animals*, 9(1), 71-87.
- Ganster, D. & Voith, V. L. (1983). Attitudes of cat owners toward cats. *Feline Practice*, 13, 21-29.
- Gerdes, A. B. M., Uhl, G. & Alpers, G. W. (2009). Spiders are special: fear and disgust evoked by pictures of arthropods. *Evolution and Human Behavior*, 30(1), 66-73.
- Gopnik, A. & Meltzoff, A. N. (1997). *Words, Thoughts and Theories*. Cambridge, MA: MIT Press.
- Hart, L. A. (1995). Dogs as human companions: a review of the relationship. In J. Serpell (Ed.), *The Domestic Dog: Its Evolution, Behaviour and Interactions with People* (pp. 161-179). NY: Cambridge University Press.
- Hatano, G., Siegler, R. S., Richards, D. D., Inagaki, K., Stavy, R. & Wax, N. (1993). The development of biological knowledge: a multi-national study. *Cognitive Development*, 8, 47-62.
- Heinrich, C. J. & Birney, B. A. (1992). Effects of live animal demonstrations on zoo visitors' retention of information. *Anthrozoös*, 5(2), 113-121.

- Hensley, C. & Tallichet, S. E. (2005). Animal cruelty motivations - Assessing demographic and situational influences. *Journal of Interpersonal Violence*, 20(11), 1429-1443.
- Hergovich, A., Monshi, B., Semmler, G. & Zieglmayer, V. (2002). The effects of the presence of a dog in the classroom. *Anthrozoös*, 15(1), 37-50.
- Herzog, H. A., Betchart, N. S. & Pittman, R. B. (1991). Gender, sex role orientation, and attitudes towards animals. *Anthrozoös*, 4, 184-191.
- Herzog, H. A. & Galvin, S. (1997). Common sense and the mental lives of animals: an empirical approach. In R. W. Mitchell (Ed.), *Anthropomorphism, Anecdotes and Animals* (pp. 237-253). Albany: State University of New York Press.
- Hickling, A. K. & Wellman, H. M. (2001). The emergence of children's causal explanations and theories: evidence from everyday conversation. *Developmental Psychology*, 37(5), 668-683.
- Holcomb, R., Williams, R. C. & Richards, P. S. (1985). The elements of attachment: relationship maintenance and intimacy. *Journal of the Delta Society*, 2, 28-34.
- Holzheimer, L., Mohay, H. & Masters, I. B. (1998). Educating young children about asthma: comparing the effectiveness of a developmentally appropriate education video tape and picture book. *Child Care, Health and Development*, 24, 85-99(1), 85-99.
- House, J. S., Landis, K. & Umberson, D. (1988). Social relationships and health. *Science*, 241, 540-544.
- Howe, D., Kahn, P. H. & Friedman, B. (1996). Along the Rio Negro: Brazilian children's environmental views and values. *Developmental Psychology*, 32(6), 979-987.
- Inagaki, K. (1990). The effects of raising animals on children's biological knowledge. *British Journal of Developmental Psychology*, 8, 119-129.
- Inagaki, K. (2001). *Effects of raising mammals on young children's biological inference*. Paper presented at the SRCD Conference, Minneapolis.
- Inagaki, K. & Hatano, G. (1996). Young children's recognition of commonalities between animals and plants. *Child Development*, 67(6), 2823-2840.
- Inagaki, K. & Hatano, G. (2002). *Young Children's Naïve Thinking About The Biological World*. Hove, UK: Psychology Press.
- Isaacs, S. (1930). *The Intellectual Growth of Children*. London: Routledge & Kegan Paul.
- Jipson, J. L. & Gelman, S. A. (2007). Robots and rodents: children's inferences about living and nonliving things. *Child Development*, 78(6), 1675-1688.
- Johnson, K. R. (1996). The ambiguous terrain of petkeeping in children's realistic animal stories. *Society & Animals*, 4(1), 1-17.
- Johnson, T. P., Garrity, T. F. & Stallones, L. (1992). Psychometric evaluation of the Lexington Attachment to Pets Scale (LAPS). *Anthrozoös*, 5(3), 160-175.
- Joiner, R., Littleton, K., Faulkner, D. & Miell, D. (2000). *Rethinking Collaborative Learning*. London: Free Association Books.
- Kafer, R., Lago, D., Wamboldt, P. & Harrington, F. (1992). The Pet Relationship Scale: Replication of psychometric properties in random samples and association with attitudes toward wild animals. *Anthrozoös*, 5, 93-105.
- Kahn, P. H. & Kellert, S. R. (2002). *Children and Nature: Psychological, Sociocultural and Evolutionary Investigations*. Cambridge: MIT Press.
- Kalish, C. W. (1996a). Causes and symptoms in preschoolers' conceptions of illness. *Child Development*, 67, 1647-1670.
- Kalish, C. W. (1996b). Preschoolers' understanding of germs as invisible mechanisms. *Cognitive Development*, 11, 83-106.
- Kalish, C. W. (2002). Essentialist to some degree: beliefs about the structure of natural kind categories. *Memory and Cognition*, 30(3), 240-352.
- Karmiloff-Smith, A. (1992). *Beyond Modularity: A Developmental Perspective on Cognitive Science*. Cambridge, MA: MIT Press.

- Kawashima, R., Hatano, G., Oizumi, K., Sugiura, M., Fukunda, H., Itoh, K., Kato, T., Nakamura, A., Hatano, K. & Kojima, S. (2001). Different neural systems for recognising plants, animals and artefacts. *Brain Research Bulletin*, 54, 313-317.
- Kellert, S. R. (1980). American attitudes toward and knowledge of animals: an update. *International Journal for the Study of Animal Problems*, 1(2), 87-119.
- Kellert, S. R. (1985). Attitudes toward animals: Age-related development among children. *Journal of Environmental Education*, 16(3), 29-39.
- Kellert, S. R. & Berry, J. K. (1987). Attitudes, knowledge and behaviors toward wildlife as affected by gender. *Wildlife Society Bulletin*, 15(3), 363-371.
- Kellert, S. R. & Westervelt, M. O. (1983). Children's attitudes, knowledge and behaviours toward animals. *Children's Environments Quarterly*, 1(1), 8-11.
- Kidd, A. H. & Kidd, R. M. (1985). Children's attitudes toward their pets. *Psychological Reports*, 57(1), 15-31.
- Knight, S., Vrij, A., Cherryman, J. & Nunkoosing, K. (2004). Attitudes towards animal use and belief in animal mind. *Anthrozoös*, 17, 43-62.
- Koocher, G. P. (1974). Talking with children about death. *American Journal of Orthopsychiatry*, 44, 404-410.
- Lago, D. J., Kafer, R., Delaney, M. & Connell, C. M. (1988). Assessment of favorable attitudes toward pets: Development and preliminary validation of self-report pet relationship scales. *Anthrozoös*, 1(4), 240-254.
- Lakestani, N. (2007). *A Study of Dog Bites and Their Prevention*. Unpublished doctoral thesis, University of Edinburgh.
- Lawrence, A. B. (2008a). Applied animal behaviour science: Past, present and future prospects. *Applied Animal Behaviour Science*, 115, 1-24.
- Lawrence, A. B. (2008b). What is animal welfare? In E. Branson (Ed.), *Fish Welfare*. Oxford: Blackwell Publishing Ltd.
- Lerner, J. E. & Kalof, L. (1999). The animal text: Message and meaning in television advertisements. *Sociological Quarterly*, 40(4), 565-586.
- Levinson, B. M. (1969). *Pet-Orientated Child Psychotherapy*. Springfield: Charles C. Thomas.
- Lewis, J., Leach, J. & Wood-Robinson, C. (2000). All in the genes? Young people's understanding of the nature of genes. *Educational Research*, 34(2), 74-79.
- Lindemann-Matthies, P. (2005). 'Loveable' mammals and 'lifeless' plants: how children's interest in common local organisms can be enhanced through observation of nature. *International Journal of Science Education*, 27(6), 655-677.
- Lookabaugh-Triebebacher, S. (1998). The relationship between attachment to companion animals and self-esteem: A developmental perspective. In C. C. Wilson & D. Turner (Eds.), *Companion Animals in Human Health* (pp. 135-148). Thousand Oaks, CA: Sage Publications, Inc.
- Lookabaugh-Triebebacher, S. (1999). Re-evaluation of the companion animal bonding scale. *Anthrozoös*, 12(3), 169-173.
- Mallon, G. P. (1992). Utilization of animals as therapeutic adjuncts with children and youth - a review of the literature. *Child & Youth Care Forum*, 21(1), 53-67.
- Mallon, G. P. (1994). Cow as co-therapist: utilization of farm animals as therapeutic aides with children in residential treatment. *Child and Adolescent Social Work Journal*, 11(6), 455-474.
- Masri, B. A. (1989). *Animals in Islam*. Ehson, Malaysia: University Kebangsaan Malaysia.
- McNicholas, J. & Collis, G. M. (2001). Children's representations of pets in their social networks. *Child Care, Health and Development*, 27(3), 279-294.
- McNicholas, J., Gilbey, A., Rennie, A., Ahmedzai, S., Dono, J. & Ormerod, E. (2005). Pet ownership and human health: a brief review of evidence and issues. *BMJ*, 331(26), 1252-1254.
- Medin, D. L. & Atran, S. (2004). The native mind: biological categorization and reasoning in development across cultures. *Psychological Review*, 111(4), 960-983.

- Mehrabian, A. & Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 40(4), 525-543.
- Melson, G., Peet, S. & Sparks, C. (1991). Children's attachment to their pets: links to socio-emotional development. *Children's Environments Quarterly*, 8(2), 55-65.
- Melson, G. F. (1990). Fostering inter-connectedness with animals and nature: The developmental benefits for children. *People-Animals-Environment*, 8(4), 15-17.
- Melson, G. F. (2001). *Why the Wild Things Are: Animals in the Lives of Children*. Cambridge: Harvard University Press
- Melson, G. F. (2003). Child development and the human-companion animal bond. *American Behavioral Scientist*, 47(1), 31-39.
- Melson, G. F. & Fogel, A. (1996). Parental perceptions of their children's involvement with household pets: A test of a specificity model of nurturance. *Anthrozoös*, 9(2-3), 95-106.
- Menache, S. (1997). Dogs: God's worst enemies? *Society & Animals*, 5, 23-44.
- Menache, S. (1998). Dogs and human beings: A story of friendship. *Society & Animals*, 6, 67-86.
- Millar, M. G. & Millar, K. U. (1996). The effects of direct and indirect experience on affective and cognitive responses and the attitude-behavior relation. *Journal of Experimental Social Psychology*, 32, 561-579.
- Miura, A., Bradshaw, J. W. S. & Tanida, H. (2002). Childhood experiences and attitudes towards animal issues: A comparison of young adults in Japan and the UK. *Animal Welfare*, 11(4), 437-448.
- Morrow, V. (1998). My animals and other family: Children's perspectives on their relationships with companion animals. *Anthrozoös*, 11(4), 218-226.
- Munsell, K. L., Canfield, M., Templer, D. I., Tangan, K. & Arikawa, H. (2004). Modification of the Pet Attitude Scale. *Society & Animals*, 12(2), 137-142.
- Muris, P., Bodden, D., Merckelbach, H., Ollendick, T. H. & King, N. J. (2003). Fear of the beast: A prospective study on the effects of negative information on childhood fear. *Behaviour Research and Therapy*, 41, 195-208.
- Muris, P., Mayer, B., Huijding, J. & Konings, T. (2008). A dirty animal is a scary animal! Effects of disgust-related information on fear beliefs in children. *Behaviour Research and Therapy*, 46, 137-144.
- Myant, K. & Williams, J.M. (2005). Children's concepts of health and illness: Understanding of contagious illness, non-contagious illness and injuries. *Health Psychology*, 10, 805-819.
- Myant, K. A. & Williams, J. M. (2008). What do children learn about biology from factual information? A comparison of interventions to improve understanding of contagious illnesses. *British Journal of Educational Psychology*, 78(2), 223-244.
- Myers, O., Saunders, C. & Garrett, E. (2004). What do children think animals need? Developmental trends. *Environmental Education Research*, 10, 545-562.
- Nagy, M. (1948). The child's theories concerning death. *Journal of Genetic Psychology*, 83, 199-216.
- Nguyen, S. (2007). An apple a day keeps the doctor away: children's evaluative categories of food. *Appetite*, 114-118.
- Nguyen, S. P. & Rosengren, K. S. (2004). Parental reports of children's biological knowledge and misconceptions. *International Journal of Behavioural Development*, 28(5), 411-420.
- Nicoll, K., Trifone, C. & Samuels, W. E. (2008). An in-class, humane education program can improve young students' attitudes toward animals. *Society & Animals*, 16(1), 45-60.
- Olson, M. A. & Kendrick, R. V. (2008). Origins of attitudes. In W. Crano & R. Prislin (Eds.), *Attitudes and Persuasion* (pp. 111-130). New York: Psychology Press.
- Ory, M. & Goldberg, E. (1983). Pet possession and life satisfaction in elderly women. In A. Katcher & A. Beck (Eds.), *New Perspectives on Our Lives With Companion Animals* (pp. 303-317). Philadelphia, PA: The University of Pennsylvania Press.
- Pagani, C., Robustelli, F. & Ascione, F. R. (2007). Italian youths' attitudes toward, and concern for, animals. *Anthrozoös*, 20(3), 275-293.

- Page, A. N. & Fragar, L. J. (2001). Recall of farm hazards in Australian primary school age children using a 3-D visual cue test. *Australian Journal of Rural Health*, 9(5), 216-221.
- Panagiotaki, G., Nobes, G., Ashraf, A., Ikram, S. & Lalji, S. (2009, June 3-5). *Children's understanding of the human body*. Paper presented at the Biological understanding and Theory of Mind: Core Knowledge and Naïve Conceptions in Children and Adults, International Conference, Reims, France.
- Paterson, D. (1989). Assessing children's attitudes towards animals. In D. Paterson & M. Palmer (Eds.), *The Status of Animals: Ethics, Education and Welfare* (pp. 58-63). Wallington, Oxon: CAB International.
- Paul, E. S. (1992). *Pets in Childhood: Individual Variation in Childhood Pet Ownership*. Unpublished PhD thesis, University of Cambridge.
- Paul, E. S. (1996). The representation of animals on children's television *Anthrozoös*, 9(4), 169-183.
- Paul, E. S. (2000). Empathy with animals and with humans: are they linked? *Anthrozoös*, 13(4), 194-202.
- Paul, E. S. & Podberscek, A. L. (2000). Veterinary education and students' attitudes towards animal welfare. *Veterinary Record*, 146, 269-272.
- Paul, E. S. & Serpell, J. (1992). Why children keep pets - the influence of child and family characteristics. *Anthrozoös*, 5(4), 231-244.
- Paul, E. S. & Serpell, J. (1993). Childhood pet keeping and humane attitudes in young adulthood. *Animal Welfare*, 2, 321-337.
- Piaget, J. (1930). *The Child's Conception of Physical Causality*. London: Routledge & Kegan Paul.
- Pine, K., Messer, D. & St John, K (2001). Children's misconceptions in primary science: a survey of teachers' views. *Research in Science and Technological Education*, 19, 79-96.
- Pines, A. L. & West, L. H. T. (1986). Conceptual understanding and science learning: an interpretation of research within a sources of knowledge framework. *Science Education*, 70, 583-604.
- Poresky, R. H. (1990). The young children's empathy measure: Reliability, validity, and effects of companion animal bonding. *Psychological Reports*, 66, 931-936.
- Poresky, R. H. (1996). Companion animals and other factors affecting young children's development. *Anthrozoös*, 9(4), 159-168.
- Poresky, R. H., Hendrix, C., Mosier, J. E. & Samuelson, M. L. (1987). The Companion Animal Bonding Scale: internal reliability and construct validity. *Psychological Reports*, 60, 743-746.
- Prokop, P. & Kubiak, M. (2008). Bad wolf kills lovable rabbits: children's attitudes toward predator and prey. *Electronic Journal of Science Education*, 12(1), 55-70.
- Prokop, P. & Tunnicliffe, S. D. (2008). "Disgusting" animals: primary school children's attitudes and myths of bats and spiders. *Eurasia Journal of Mathematics, Science & Technology Education*, 4(2), 87-97.
- Raupp, C. D. (1999). Treasuring, trashing or terrorizing: Adult outcomes of childhood socialization about companion animals. *Society & Animals*, 7(2), 141-159.
- Reiss, M. J., Tunnicliffe, S. D., Andersen, A. M., Bartoszeck, A., Carvalho, G. S., Chen, S., Jarman, R., Jónsson, S., Manokore, V., Marchenko, N., Mulemwa, J., Novikova, T., Otuka, J., Teppa, S. & Van Rooy, W. (2002). An international study of young people's drawings of what is inside themselves. *Journal of Biological Education*, 36(2), 58-64.
- Ricard, M. & Allard, L. (1993). The reaction of 9- to 10-month-old infants to an unfamiliar animal. *The Journal of Genetic Psychology*, 154(1), 5-16.
- Richardson, R. C. & Norman, K. I. (2000). Intrinsic goodness: Facilitating character development. *Kappa Delta Pi Record*, 36(4), 168 -172.
- Rosengren, K. S., Gelman, S. A., Kalish, C. W. & McCormick, M. (1991). As time goes by - children's early understanding of growth in animals. *Child Development*, 62(6), 1302-1320.

- Ross, N., Medin, D. L., Coley, J. D. & Atran, S. (2003). Cultural and experiential differences in the development of folkbiological induction. *Cognitive Development* 18, 25-47.
- Rozin, P., Fallon, A. E. & Augustinin-Ziskind, M. L. (1985). The child's conception of food: the development of contamination sensitivity to "disgusting" substances. *Developmental Psychology*, 21, 1075-1079.
- Rudman, L. A. (2004). Sources of implicit attitudes. *Current Directions in Psychological Science*, 13(2), 79-82.
- Safier, G. (1964). A study in the relationships between the life and death concepts in children. *Journal of Genetic Psychology*, 105, 283-294.
- Schenk, S., Templer, D. I., Peters, N. B. & Schmidt, M. (1994). The genesis and correlates of attitudes toward pets. *Anthrozoös*, 7, 60-68.
- Serpell, J. A. (1999). Guest editor's introduction: Animals in children's lives. *Society & Animals*, 7(2), 87-94.
- Serpell, J. A. (2004). Factors influencing human attitudes towards animals and their welfare. *Animal Welfare*, 13, 145-151.
- Shweder, R. A., Mahapatra, M. & Miller, J. G. (1987). Culture and moral development. In J. Kagan & S. Lamb (Eds.), *The Emergence of Morality in Young Children* (pp. 1-82). London: The University of Chicago Press Ltd.
- Siegal, M. & Peterson, C. (1999). *Children's Understanding of Biology and Health*. Cambridge, UK: Cambridge University Press.
- Siegel, J. M. (1995). Pet ownership and the importance of pets among adolescents. *Anthrozoös*, 8, 217-223.
- Slaughter, V., Jaakola, R. & Carey, S. (1999). Constructing a coherent theory: children's biological understanding of life and death. In M. Siegal & C. C. Peterson (Eds.), *Children's Understanding of Biology and Health*. Cambridge: CUP.
- Smith, L. A. & Williams, J. M. (2007). "It's the X and Y thing": Cross-sectional and longitudinal changes in children's understanding of genes. *Research in Science Education*, 37, 407-422.
- Smith, M. H., Meehan, C. L., Enfieldt, R. P. & Castori, P. (2005). Using drawings to assess self-animal perceptions. *Anthrozoös*, 18(2), 122-139.
- Sobel, D. (1996). *Beyond Ecophobia: Reclaiming the Heart of Nature Education*. Great Barrington, MA: The Orion Society.
- Solomon, G. E. A., Johnson, S. C., Zaitchik, D. & Carey, S. (1996). Like father, like son: young children's understanding of how and why offspring resemble their parents. *Child Development*, 67, 151-171.
- Spiegel, I. B. (2000). A pilot study to evaluate an elementary school-based dog bite prevention program. *Anthrozoös*, 13(2), 164-173.
- Springer, K. (1999). How a naïve theory of biology is acquired. In M. Siegal & C. C. Peterson (Eds.), *Children's Understanding of Biology and Health*. Cambridge: CUP.
- Springer, K. & Keil, F. C. (1989). On the development of biologically specific beliefs: the case of inheritance. *Child Development*, 62, 767-781.
- Staats, S., Miller, D., Carnot, M. J., Rada, K. & Turnes, J. (1996). The Miller-Rada Commitment to Pets Scale. *Anthrozoös*, 9, 88-94.
- Stanisstreet, M., Spofforth, N. & Williams, T. (1993). Attitudes of children to the uses of animals. *International Journal of Science Education*, 15(4), 411-425.
- Stavy, R. & Wax, N. (1989). Children's conceptions of plants as living things. *Human Development*, 32, 88-94.
- Stevens, L. T. (1990). Attachment to pets among eighth graders. *Anthrozoös*, 3(3), 177-183.
- Templer, D. I., Salter, C. A., Dickery, S., Baldwin, R. & Veleber, D. M. (1981). The construction of a pet attitude scale. *The Psychological Record*, 31, 343-348.
- Thompson, K. L. & Gullone, E. (2003). Promotion of empathy and prosocial behaviour in children through humane education. *Australian Psychologist*, 38(3), 175-182.

- Toyama, N., Lee, Y. M. & Muto, T. (1997). Japanese preschoolers' understanding of biological concepts related to procedures for animal care. *Early Childhood Research Quarterly*, 12(3), 347-360.
- Tunnicliffe, S. D. (1996). Conversations within primary school parties visiting animal specimens in a museum and zoo. *Journal of Biological Education*, 30(2), 130-141.
- Tunnicliffe, S. D., Lucas, A. M. & Osbourne, J. (1997). School visits to zoos and museums: a missed educational opportunity. *International Journal of Science Education*, 19, 1039-1056.
- Unnewehr, S., Schneider, S., Florin, I. & Margraf, J. (1998). Psychopathology in children of patients with panic disorder or animal phobia. *Psychopathology*, 31(2), 69-84.
- Vidovic, V., Stetic, V. V. & Bratko, D. (1999). Pet ownership, type of pet and socio-emotional development of school children. *Anthrozoös*, 12, 211-217.
- Wellman, H. M. & Gelman, S. A. (1992). Cognitive development: Foundational theories of core domains. *Annual Review of Psychology*, 43, 337-375.
- Wellman, H. M. & Inagaki, K. (1997). *The Emergence of Core Domains of Thought: Children's Reasoning about Physical, Psychological and Biological Phenomena*. New Directions for Child Development. San Francisco: Jossey Bass.
- Wellman, H. M. & Johnson, C. N. (1982). Children's understanding of food and its functions: a preliminary study of the development of concepts of nutrition. *Journal of Applied Developmental Psychology*, 3, 135-148.
- Wells, D. L. & Hepper, P. G. (1995). Attitudes to animal use in children. *Anthrozoös*, 8(3), 159-170.
- Williams, J. M. (2009, June 3-5). *Conceptual coherence in naïve biology: the case of inheritance concepts*. Paper presented at the Biological understanding and Theory of Mind: Core Knowledge and Naïve Conceptions in Children and Adults, International Conference, Reims, France.
- Williams, J. M. & Affleck, G. (1999). The effects of an age-appropriate intervention on young children's understanding of inheritance. *Educational Psychology*, 19, 259-275.
- Williams, J. M. & Binnie, L. M. (2002). Children's concepts of illness: An intervention to improve knowledge. *British Journal of Health Psychology*, 7, 129-147.
- Williams, J. M. & Smith, L. A. (2006). Social and experiential influences on the development of inheritance concepts. *International Journal of Behavioural Development*, 30, 170-179.
- Williams, J. M. & Tolmie, A. (2000). Conceptual change in biology: Group interaction and the understanding of inheritance. *British Journal of Developmental Psychology*, 18, 625-649.
- Wilson, C. C., Netting, F. E. & New, J. C. (1987). The Pet Attitude Inventory. *Anthrozoös*, 1(2), 76-84.
- Wilson, F., Dwyer, F. & Bennet, C. (2003). Prevention of dog bites: evaluation of a brief educational program for preschool children. *Journal of Community Psychology*, 31(1), 75-86.
- Wood, L., Giles-Corti, B. & Bulsara, M. (2005). The pet connection: pets as a conduit for social capital? *Social Science & Medicine*, 61, 1159-1173.
- Zasloff, R. L. (1996). Measuring attachment to companion animals: a dog is not a cat is not a bird. *Applied Animal Behaviour Science*, 47 43-48.
- Zasloff, R. L., Hart, L. A. & DeArmond, H. (1999). Animals in elementary school education in California. *Journal of Applied Animal Welfare Science*, 2(4), 347-357.

PROMOTING A 'DUTY OF CARE' TOWARDS ANIMALS AMONG CHILDREN AND YOUNG PEOPLE

